

COMPLETE

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 629011

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. John M. Conner, Data Assessment & Interpretation/R2-12/373-2711		3a. USQ Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Date 02-15-96
	5. Project Title/No./Work Order No. Tank 241-BX-112	6. Bldg./Sys./Fac. No. NA	7. Approval Designator Q	
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-DP-157, REV. 0	9. Related ECN No(s). NA	10. Related PO No. NA	
11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. NA	11c. Modification Work Complete N/A _____ Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) N/A _____ Cog. Engineer Signature & Date	
12. Description of Change This ECN is being generated in order to update/add additional information to the existing document.				
13a. Justification (mark one) Criteria Change <input checked="" type="checkbox"/> Design Improvement <input type="checkbox"/> Environmental <input type="checkbox"/> Facility Deactivation <input type="checkbox"/> As-Found <input type="checkbox"/> Facilitate Const <input type="checkbox"/> Const. Error/Omission <input type="checkbox"/> Design Error/Omission <input type="checkbox"/>				
13b. Justification Details This ECN will assist in the completion of the documentation process for this document.				
14. Distribution (include name, MSIN, and no. of copies) See Attached Distribution Sheet.			<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">RELEASE STAMP</p> <div style="display: flex; justify-content: space-between;"> <div> DATE: _____ STA. 4 </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> HANFORD RELEASE </div> <div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> 3 </div> </div> <p style="text-align: right;">ID: _____</p> <p style="text-align: center; font-weight: bold;">FEB 29 1996</p> </div>	

ENGINEERING CHANGE NOTICE

Page 2 of 2

1. ECN (use no. from pg. 1)

629011

15. Design Verification Required

☐ Yes

☒ No

16. Cost Impact

ENGINEERING

Additional ☐ \$

Savings ☐ \$

CONSTRUCTION

Additional ☐ \$

Savings ☐ \$

17. Schedule Impact (days)

Improvement ☐

Delay ☐

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	<input type="checkbox"/>	Seismic/Stress Analysis	<input type="checkbox"/>	Tank Calibration Manual	<input type="checkbox"/>
Functional Design Criteria	<input type="checkbox"/>	Stress/Design Report	<input type="checkbox"/>	Health Physics Procedure	<input type="checkbox"/>
Operating Specification	<input type="checkbox"/>	Interface Control Drawing	<input type="checkbox"/>	Spares Multiple Unit Listing	<input type="checkbox"/>
Criticality Specification	<input type="checkbox"/>	Calibration Procedure	<input type="checkbox"/>	Test Procedures/Specification	<input type="checkbox"/>
Conceptual Design Report	<input type="checkbox"/>	Installation Procedure	<input type="checkbox"/>	Component Index	<input type="checkbox"/>
Equipment Spec.	<input type="checkbox"/>	Maintenance Procedure	<input type="checkbox"/>	ASME Coded Item	<input type="checkbox"/>
Const. Spec.	<input type="checkbox"/>	Engineering Procedure	<input type="checkbox"/>	Human Factor Consideration	<input type="checkbox"/>
Procurement Spec.	<input type="checkbox"/>	Operating Instruction	<input type="checkbox"/>	Computer Software	<input type="checkbox"/>
Vendor Information	<input type="checkbox"/>	Operating Procedure	<input type="checkbox"/>	Electric Circuit Schedule	<input type="checkbox"/>
OM Manual	<input type="checkbox"/>	Operational Safety Requirement	<input type="checkbox"/>	ICRS Procedure	<input type="checkbox"/>
FSAR/SAR	<input type="checkbox"/>	IEFD Drawing	<input type="checkbox"/>	Process Control Manual/Plan	<input type="checkbox"/>
Safety Equipment List	<input type="checkbox"/>	Cell Arrangement Drawing	<input type="checkbox"/>	Process Flow Chart	<input type="checkbox"/>
Radiation Work Permit	<input type="checkbox"/>	Essential Material Specification	<input type="checkbox"/>	Purchase Requisition	<input type="checkbox"/>
Environmental Impact Statement	<input type="checkbox"/>	Fac. Proc. Samp. Schedule	<input type="checkbox"/>	Tickler File	<input type="checkbox"/>
Environmental Report	<input type="checkbox"/>	Inspection Plan	<input type="checkbox"/>		<input type="checkbox"/>
Environmental Permit	<input type="checkbox"/>	Inventory Adjustment Request	<input type="checkbox"/>		<input type="checkbox"/>

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision

Document Number/Revision

Document Number Revision

NA

20. Approvals

Signature

Date

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Date

OPERATIONS AND ENGINEERING

Cog. Eng. J. M. Conner

Cog. Mgr. J. G. Kristofzski

AEQA E. W. Miller

QA T. L. Tung

Environ.

Other

Production Planning & Control A. D. Rice

R.D. Schreiber

2/27/96

2/27/96

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2-27-96

2/29/96

ARCHITECT-ENGINEER

PE

QA

Safety

Design

Environ.

Other

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

"FINAL REPORT FOR TANK 241-BX-112, AUGER SAMPLES 95-AUG-047 AND 95-AUG-048."

John M. Conner
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

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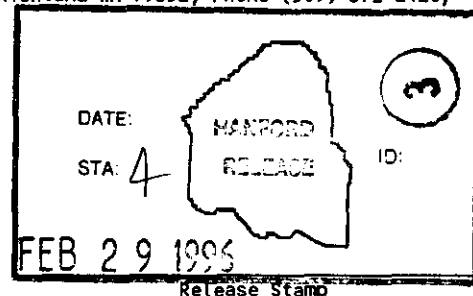
Key Words: Final Report for Tank 241-BX-112, Auger Samples 95-AUG-047 &
95-AUG-048

Abstract: N/A

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 2/29/96
Release Approval Date



Approved for Public Release

John Kent 2-27-96



**Westinghouse
Hanford Company**

P.O. Box 1970 Richland, WA 99352

WHC-SD-WM-DP-157, REV. 1

ANALYTICAL SERVICES

**FINAL REPORT FOR TANK 241-BX-112,
AUGER SAMPLES 95-AUG-047 AND 95-AUG-048**

Project Coordinator: JOHN M. CONNER

**Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management**

by

**Westinghouse Hanford Company
Box 1970
Richland, Washington**

WHC-SD-WM-DP-157, REV. 1
TABLE OF CONTENTS

Narrative	1
Sample Data Summary	6
Chain of Custody Forms	9
Photographs	12
Sample Handling	15
Extrusion Worklist # 3662	16
Extrusion Worklist # 3663	17
Sample Preparations	18
Fusion Digestion Worklist # 3686	19
Fusion Digestion Worklist # 3693	20
Radiochemical Analyses	21
Total Alpha Analysis (AT)	
AT Worklist # 3737	22
AT Worklist # 3872	28
AT Worklist # 3873	35
Part II 45-Day Safety Screening Results for Tank 241-BX-112, Auger Samples 95-AUG-047 and 95-AUG-048	41
Narrative	43
Sample Data Summary	48
Inorganic Analyses	51
Differential Scanning Calorimetry (DSC)	
DSC Worklist # 3729	52
DSC Worklist # 3735	56
DSC Worklist # 4000	62
Thermogravimetric Analysis (TGA)	
TGA Worklist # 3730	63
TGA Worklist # 3734	67
TGA Worklist # 4003	73

This Document consists of pages 1 through 77.

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WHC-SD-WM-DP-157, REV. 1

NARRATIVE

**FINAL REPORT FOR TANK 241-BX-112,
AUGER SAMPLES 95-AUG-047 AND 95-AUG-048**

ANALYTICAL SUMMARY

Two auger samples were taken from tank 241-BX-112 (BX-112). The samples were received at the 222-S Laboratories and underwent safety screening analyses, consisting of differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), bulk density, and determination of total alpha activity. As appropriate, the results were compared to the safety screening limits at a confidence level of 95%. All analytical results were within the action limits stated in the SAP.

Based on the results of vapor monitoring prior to sampling, the BX-112 vapor space is far below the lower explosive limit (LEL). None of the data indicate that the tank is "unsafe" when compared to the criteria (energetics, criticality, and flammability) in the *Tank Safety Screening Data Quality Objective* (Dukelow, et al., 1995). However, the tank cannot be declared "safe," as two full length profiles were not obtained by auger sampling. Core sampling will be necessary to fully satisfy the DQO.

SCOPE

This document serves as the final report deliverable for the tank BX-112 auger samples collected on November 16 and 17, 1995 (samples 95-AUG-047 and 95-AUG-048). The 222-S Laboratories received, extruded, and analyzed each sample in accordance with the SAP [1]. This report is broken into two parts. Part I contains the revised narrative, final data tables, copies of the sample chain-of-custody sheets, photographs of the extruded augers, and all raw data not included in the original report. Part II consists of the original 45-day safety screening report (which includes the DSC and TGA raw data).

TANK DOME SPACE FLAMMABILITY SCREENING

Prior to auger sampling, the vapor space of tank BX-112 was screened for flammability issues. The results of combustible gas monitoring inside riser 3 of tank BX-112 are presented in Table 1. This measurement is conducted in the field and recorded in the work package (work package for BX-112 auger sampling is #ES-95-00217). The results indicated that the tank vapor space was at 0% of the LEL, far below the action limit of 10% stated in the DQO [2].

Table 1. Characteristics of BX-112 Vapor Space as Determined by Combustible Gas Monitoring.

Measurement	Result
Lower Explosive Limit (LEL)	0%
Oxygen (O ₂)	20.9%
Total Organic Carbon (TOC)	11.3 ppm
Ammonia (NH ₃)	125 ppm

SAMPLE RECEIPT, EXTRUSION, AND SUBSAMPLING

95-AUG-047

Auger sample 95-AUG-047 was collected from riser 3 of tank BX-112 on November 16, 1995, and extruded on November 21, 1995. This was a 50 cm (20 inch) auger sampler, with 39 flutes (this was the first time that this auger was used. It has twice as many flutes as the typical auger). The sample appeared fairly homogeneous. The waste was a very wet, light-brown sludge, which tended to drip from the auger onto the extrusion tray. Flutes 1-8 at the top of the auger were bare. The material on flutes 9-16 appeared slightly less wet than the lower portion of the sample. The material on flutes 9-16, totaling 45.8 grams, was segregated as the upper half-segment solids. Flutes 17-39 contained lumpy sludge (lumps disappeared upon subsampling). A total of 165.2 grams was subsampled as the lower half-segment solids. The half segment subsamples were homogenized and subsampled for further laboratory analyses, bulk density determination, and archiving.

95-AUG-048

Auger sample 95-AUG-048 was collected from riser 2 of Tank BX-112 on November 17, 1995, and extruded on November 21. This was a 50 cm (20 inch) auger sampler, with 19 flutes. The sample appeared to be a homogeneous, medium-brown, very wet sludge. Flutes 1-6 were bare. The sample was recovered on flutes 7-19, and mostly dripped off of the auger onto the extrusion tray. Due to the apparent length of the sample recovered [30 cm (12 inches)], the moderate-to-low recovery (81.3 g), and the apparent homogeneity, the sample was not subsampled into half segments, but homogenized at the whole-segment level. Portions were then subsampled for bulk density determination and further laboratory analyses and archiving.

ANALYTICAL RESULTS

BULK DENSITY

Three subsamples were submitted for bulk density determination by centrifugation in a tared, graduated, vial per procedure LA-160-103, Rev. A-7. The results ranged from 1.31 to 1.35 g/cm³. These results are presented in the summary tables. In order to conserve sample, duplicate analyses were not conducted.

THERMOGRAVIMETRIC ANALYSIS (TGA)

Three samples were submitted for moisture content determination by TGA per procedures LA-560-112, Rev. B-2, or LA-514-114, Rev. C-1 (a different procedure is used for each instrument). The samples were analyzed in duplicate. The results are presented in the summary tables, and the raw data scans are attached. All results were between 55.59 and 65.50 percent moisture. The relative percent difference (RPD) between sample and duplicate results for sample S95T003746 was 11.4%, which slightly exceeded the criterion

of less than 10% given in the SAP. Inspection of the raw data (attached) indicates that the sample and duplicate scans are similar in shape, except that the weight loss for the sample result appears to begin at approximately 100 °C, instead of at ambient temperature. The chemist attributed this to static charge holding the sample tray to the side of the furnace [3]. Once the static charge was overcome, the weight loss scan appears very similar in shape to the scan of the duplicate sample (although the endpoint differs by almost 7 weight percent). The sample was rerun in duplicate. The RPD for the rerun was 1.71%. Both the original results and the results of the rerun are included in the summary tables. The results of the rerun are noted by a "1" next to the sample number.

DIFFERENTIAL SCANNING CALORIMETRY (DSC)

Three samples were submitted for determination of energetics by DSC per procedure LA-514-113, Rev. C-1 or procedure LA-514-114, Rev. C-1. The samples were analyzed in duplicate. The results are presented in the summary tables, and the raw data scans are attached. None of the samples exhibited exotherms. Since none of the samples exhibited any exotherms, the statistical calculation of an upper 95% confidence level for each sample is unnecessary.

ALPHA TOTAL

Three solids samples were submitted for total alpha analysis per procedure LA-508-101, Rev. D-2. The samples were fused per procedure LA-549-141, Rev. D-0 prior to analysis. Two fusions were prepared per sample (for duplicate results). Each fused dilution was analyzed twice; the results were averaged and reported as one value. The highest result returned was 0.219 $\mu\text{Ci/g}$, more than two orders of magnitude below the action limit of 41 $\mu\text{Ci/g}$. The upper 95% confidence level for each sample has been calculated and is presented in Table 2. All of the adjusted results are far below the action limit of 41 $\mu\text{Ci/g}$ stated in the SAP. The RPD for sample S95T003751 was 22.3%. However, no rerun was deemed necessary, as the 95% confidence limit upper value for this sample was 0.336 $\mu\text{Ci/g}$, far below the action limit of 41 $\mu\text{Ci/g}$.

The alpha results reported by the lab are calculated assuming a density of 1.5 g/cm^3 for solid samples. As the bulk density results recorded for these samples are all below 1.5 g/cm^3 , the alpha results reported remain conservative per the calculation described in the SAP [1].

One of the two standards run with these samples exhibited a recovery slightly outside the range specified in the SAP (110.2%). Since the result was so close to being within range, and the sample results were far below the limit, a rerun was deemed unnecessary. This result was well within the method control limits of 72.3-125.9%. All quality control results are presented in the summary tables.

WHC-SD-WM-DP-157, Rev. 1

Table 2. Comparison of Total Alpha Results at a Confidence Level of 95%.
(All units in $\mu\text{Ci/g}$).

Sample Description/ Sample Number	Sample Result	Duplicate Result	Mean	Var(Mean)	Upper 95% Confidence Limit
AUG-047 UH S95T003747	0.187	0.178	0.182	2.025E-05	0.211
AUG-047 LH S95T003751	0.175	0.219	0.197	4.84E-04	0.336
AUG-048 WS S95T003755	0.183	0.170	0.176	4.23E-05	0.218
AUG-047, AUG-048 combined	-	-	0.183 (weighted mean)	5.12E-05	0.228

Notes: var(mean) - variance of the mean; UH - upper half;
LH - lower half; WS - whole segment;
weighted mean - average for each auger given equal weight

REFERENCES

- [1] J. M. Conner, *Tank 241-BX-112 Auger Sampling and Analysis Plan*, WHC-SD-WM-TSAP-051, Rev. 0A, Westinghouse Hanford Company, Richland, Washington, November 15, 1995.
- [2] G. T. Dukelow, et al., *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington, August 31, 1995.
- [3] Personal Communication with B. D. Valenzuela, December 1, 1995.

WHC-SD-WM-DP-157, REV. 1

SAMPLE DATA SUMMARY

Final Report for Auger Samples 95-AUG-047/048, Tank BX-112
BX-112

CORE NUMBER: 95-AUG-047, 95-AUG-048
SEGMENT #: 95-AUG-047

SEGMENT PORTION: U Upper Half of Segment

Sample#	R	A#	Analyte	Unit	Action Limits		Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
					Lower	Upper										
S95T003745			Bulk Density of Sample	g/mL	None	None	n/a	n/a	1.350	n/a	n/a	n/a	n/a	5.00e-01		n/a
S95T003746	1		% Water by TGA on Perkin Elmer	%	None	None	101.0	n/a	60.72	61.77	61.25	1.71	n/a	n/a		n/a
S95T003746			% Water by TGA on Perkin Elmer	%	None	None	100.5	n/a	55.59	62.30	58.95	11.4	n/a	n/a		n/a
S95T003746			DSC Exotherm on Perkin Elmer	Joules/g	-1.0e+01	488.8	99.96	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a		n/a
S95T003746			DSC Exotherm Dry Calculated	Joules/g Dry	-1.0e+01	488.8	n/a	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a		n/a
S95T003747	F		Alpha of Digested Solid	uCi/g	-1.0e+01	41.81	92.97	<4.33e-03	1.87e-01	1.78e-01	1.82e-01	4.93	n/a	5.47e-03	8.30E+00	

L Lower Half of Segment: L Lower Half of Segment

Sample#	R	A#	Analyte	Unit	Action Limits		Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
					Lower	Upper										
S95T003749			Bulk Density of Sample	g/mL	None	None	n/a	n/a	1.310	n/a	n/a	n/a	n/a	5.00e-01		n/a
S95T003750			% Water by TGA on Perkin Elmer	%	None	None	100.5	n/a	63.37	63.52	63.45	0.24	n/a	n/a		n/a
S95T003750			DSC Exotherm on Perkin Elmer	Joules/g	-1.0e+01	488.8	99.96	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a		n/a
S95T003750			DSC Exotherm Dry Calculated	Joules/g Dry	-1.0e+01	488.8	n/a	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a		n/a
S95T003751	F		Alpha of Digested Solid	uCi/g	-1.0e+01	41.81	110.2	<3.12e-03	1.75e-01	2.19e-01	1.97e-01	22.3	98.47	3.80e-03	8.51E+00	

=> Limit violated
=> Selected Limit

Final Report for Auger Samples 95-AUG-047/048, Tank BX-112
BX-112

CORE NUMBER: 95-AUG-047, 95-AUG-048
SEGMENT #: 95-AUG-048

SEGMENT PORTION: W Whole Segment

Sample#	R	A#	Analyte	Unit	Action Limits		Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
					Lower	Upper									
S95T003753			Bulk Density of Sample	g/mL	None	None	n/a	n/a	1.310	n/a	n/a	n/a	n/a	5.00e-01	n/a
S95T003754			% Water by TGA using Mettler	%	None	None	100.5	n/a	65.42	65.50	65.46	0.12	n/a	n/a	n/a
S95T003754			DSC Exotherm Dry Calculated	Joules/g Dry	-1.0e+01	480.0	n/a	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S95T003754			DSC Exotherm using Mettler	Joules/g	-1.0e+01	488.0	92.44	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S95T003755	F		Alpha of Digested Solid	uCi/g	-1.0e+01	41.03	92.97	<4.24e-03	1.83e-01	1.70e-01	1.76e-01	7.37	n/a	4.98e-03	7.73E+00

=> Limit violated

=> Selected Limit

∞

WMC-SD-WM-DP-157, REV.1

WHC-SD-WM-DP-157, REV. 1

CHAIN OF CUSTODY FORMS

CHAIN-OF-CUSTODY RECORD FOR AUGER SAMPLING

(1) Shipment Number 200W-08-TF (2) Sample Number 95-Aug-047 (3) Supervisor B. Pezvik
 (4) Tank BX-112 (5) Riser 3 (6) Cask Serial Number 216

Radiation Survey Data:		(7) FIELD	(31) LABORATORY	(8) Shipment Description	
Over Top Dose Rate		<u>1 mR @ C</u>	<u>1 mR/hr at C</u>	A. Work Package Number	<u>ES-95-00217/D</u>
Side Dose Rate		<u>8 mR @ C</u>	<u>10 mR/hr at C</u>	B. Cask Seal Number	<u>141-95-216-1662</u>
Bottom Dose Rate		<u>5 mR @ C</u>	<u>3 mR/hr at C</u>	C. Date and Time Sample	<u>11/16/95 1130 AM</u>
Smearable Contamination		<u>L20</u> (Alpha)	<u><20 dpm/100 cm²</u> (Alpha)	D. Expected Liquid Content	<u>10%</u>
		<u>L1000</u> (Beta-Gamma)	<u><100 dpm/100 cm²</u> (Beta-Gamma)	E. Expected Solid Content	<u>90%</u>
RCT*	<u>[Signature]</u> (Signature)	RCT*	<u>[Signature]</u> (Signature)	F. Dose Rate Through Drill String	<u>250 mR/hr</u>
				G. Expected Sample Length	<u>15'</u>

(9) INFORMATION (Include statement of laboratory tests to be performed.)

BEST AVAILABLE COPY

(10) Field Comments			(32) Laboratory Comments		
(11) Point of Origin <u>BX-112</u> (12) Destination <u>R22</u> (13) Sender Name (Sign and PRINT) <u>Bob Pezvik</u> (14) Date/Time <u>11/17/95 1320</u> (15) Sender Comments (17) Relinquished By (Sign and PRINT) <u>Bob Pezvik</u> (18) Received By (Sign and PRINT) <u>James A. Lapiers</u> (21) Relinquished By (Sign and PRINT) <u>James A. Lapiers</u> (22) Received By (Sign and PRINT) <u>N. Lapiers</u> (25) Relinquished By (Sign and PRINT) (26) Received By (Sign and PRINT)			(19) Date/Time <u>11-17-95/1437</u> (20) Receiver Comments (23) Date/Time <u>11-17-95/1520</u> (24) Receiver Comments (27) Date/Time (28) Receiver Comments		
(29) Seal Intact Upon Receipt? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			(30) Seal Data Consistent with this Record? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

COPY

CHAIN-OF-CUSTODY RECORD FOR AUGER SAMPLING

Shipment Number 200W-08-TF (2) Sample Number 95-Aug-048 (3) Supervisor B. PRAZNIK
 Tank BX-112 (5) Riser 2 (6) Cask Serial Number C-1016

Emission Survey Data:

	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<u>2.0.5 mR/h C</u>	<u>2.0 4.5 mR/hr alc</u>
Side Dose Rate	<u>2.5 mR/h C</u>	<u>4.5 mR/hr alc</u>
Bottom Dose Rate	<u>2.5 mR/h C</u>	<u>2.8 mR/hr alc</u>
Smearable Contamination	<u>42.7</u> (Alpha)	<u>< 200 dpm/100 cm²</u> (Alpha)
	<u>41000</u> (Beta-Gamma)	<u>41000 dpm/100 cm²</u> (Beta-Gamma)
RCT* <u>B. Praznik</u> (Signature)		RCT* <u>[Signature]</u> (Signature)

(8) Shipment Description

A. Work Package Number ES-95-00217/0
 B. Cask Seal Number 1663
 C. Date and Time Sample 11/17/95 1117
 Removed from Tank 1117
 D. Expected Liquid Content 10%
 E. Expected Solid Content 90%
 F. Dose Rate Through Drill String 150 mR/hr
 G. Expected Sample Length 15"

INFORMATION (Include statement of laboratory tests to be performed.)

BEST AVAILABLE COPY

(9) Field Comments

(32) Laboratory Comments

1) Point of Origin <u>SX-112</u>	(12) Destination <u>2225</u>	(13) Sender Name (Sign and PRINT) <u>B. PRAZNIK</u>	(14) Date/Time <u>11/17/95</u>	(15) Sender Comments
7) Relinquished By (Sign and PRINT) <u>B. Praznik</u>	(18) Received By (Sign and PRINT) <u>AMAR [Signature]</u>	(19) Date/Time <u>11-17-95/1430</u>	(20) Receiver Comments	
1) Relinquished By (Sign and PRINT) <u>AMAR [Signature]</u>	(22) Received By (Sign and PRINT) <u>[Signature]</u>	(23) Date/Time <u>11-17-95/1530</u>	(24) Receiver Comments	
5) Relinquished By (Sign and PRINT)	(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments	

Seal Intact Upon Release?

☐ No

(29) Seal Intact Upon Receipt?

☒ Yes☐ No

Shipment No.

☒ Yes☐ No

(30) Seal Data Consistent with this Record?

Cask Seal No.

☒ Yes☐ No

Sample No.

☒ Yes☐ No

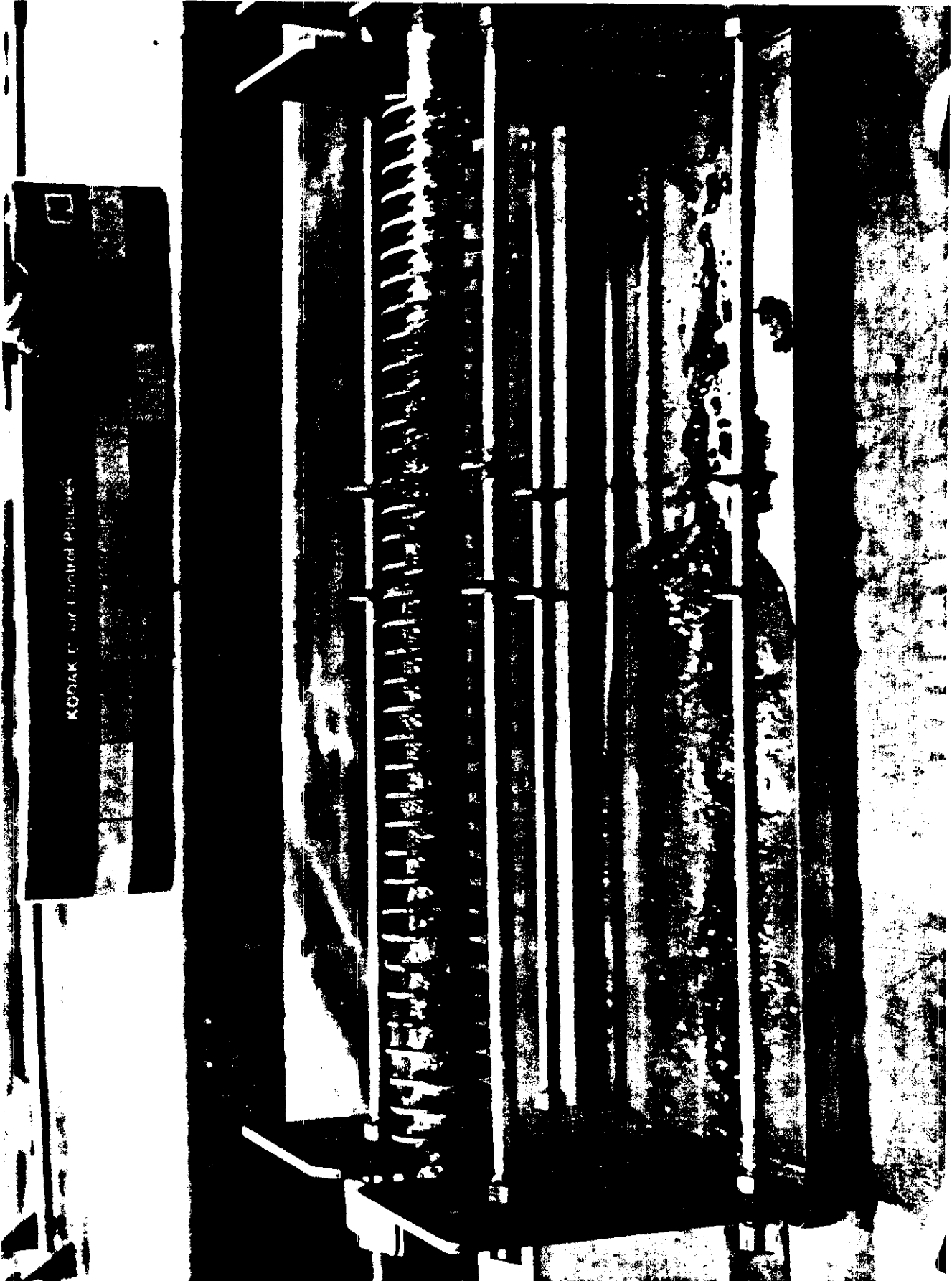
WHC-SD-WM-DP-157, REV. 1

PHOTOGRAPHS

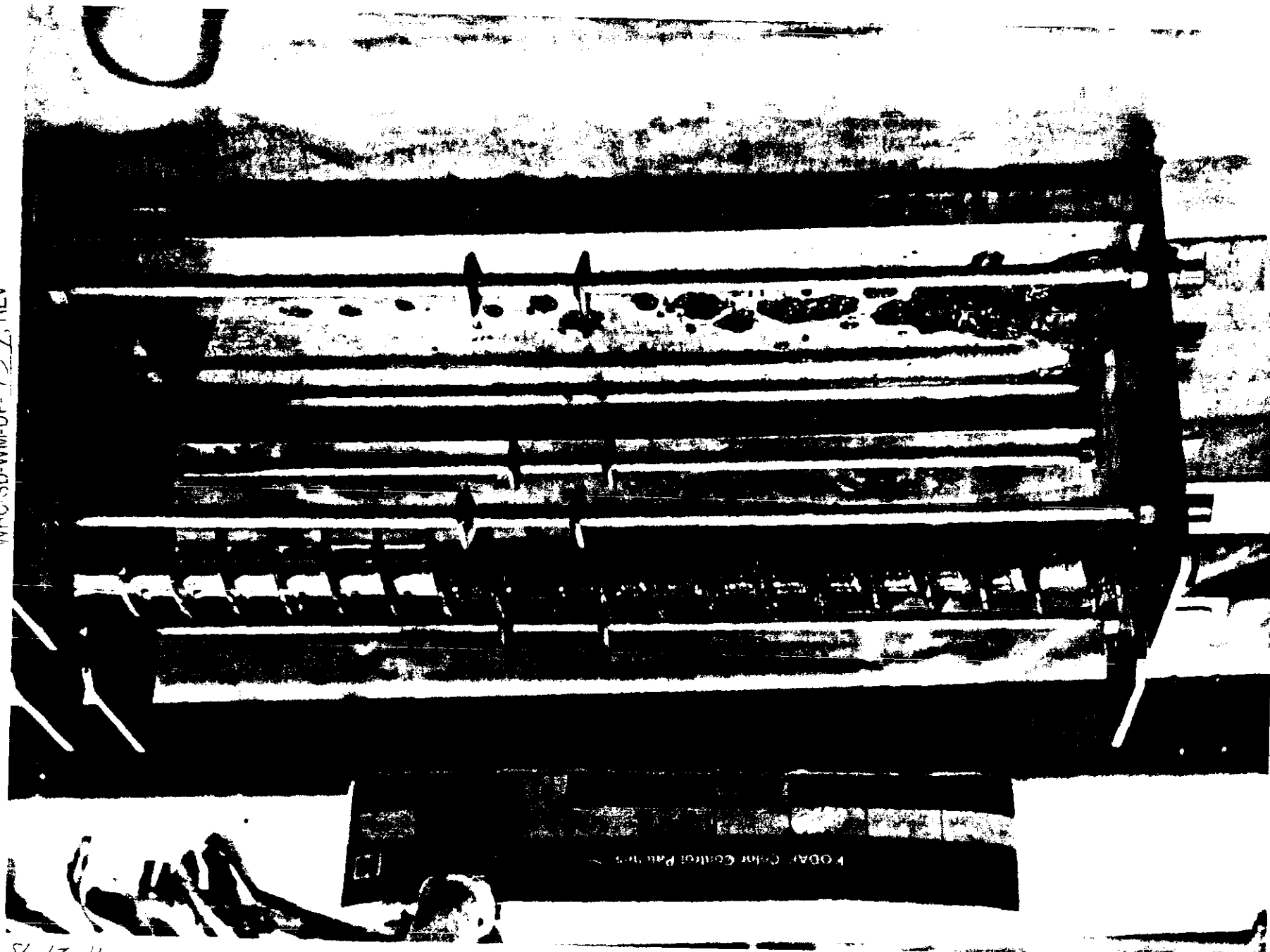
BX-112 95-AUG-047

11-21-95

WFO-SD-WM-EP-157, REV 1



W/C SD-WM-OP-152, REV 1



BX-112 95-AUG-048

11-21 95

WHC-SD-WM-DP-157, REV. 1

SAMPLE HANDLING

LABCORE Data Entry Template for Worklist#

3662

Analyst: CC Instrument: BA000 Book # NA

Method: LO-160-103 Rev/Mod A-7

Worklist Comment: BX-112 95-AUG-047 RISER 3 EXTRUSION

GROUP	PROJECT	S TYPE	SAMPLE#	R A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 INSTCHK01			EXTRUD01	SOLID	<u>20</u>	<u>19.99</u>	<u>N/A</u>	
		2 INSTCHK02			EXTRUD01	SOLID	<u>500</u>	<u>499.69</u>	<u>N/A</u>	
95000202	BX-112	3 SAMPLE	S95T003743	0	DLIQVOL1	SOLID	<u>N/A</u>	<u>0</u>		mL
95000202	BX-112	4 SAMPLE	S95T003743	0	DLIQWT01	SOLID	<u>N/A</u>	<u>0</u>		g
95000202	BX-112	5 SAMPLE	S95T003743	0	EST.G/ML	SOLID	<u>N/A</u>	<u>0</u>		g/mL
95000202	BX-112	6 SAMPLE	S95T003743	0	EXTRUD01	SOLID	<u>N/A</u>	<u>complete</u>		
95000202	BX-112	7 SAMPLE	S95T003743	0	LLIQWT01	SOLID	<u>N/A</u>	<u>25</u>		g
95000202	BX-112	8 SAMPLE	S95T003743	0	NOTEBOOK	SOLID	<u>N/A</u>	<u>N/A</u>		
95000202	BX-112	9 SAMPLE	S95T003743	0	SLDVOL01	SOLID	<u>N/A</u>	<u>NA</u>		mL
95000202	BX-112	10 SAMPLE	S95T003743	0	SLDWT-01	SOLID	<u>N/A</u>	<u>211.0</u>		g
95000202	BX-112	11 SAMPLE	S95T003743	0	APPEAR01	SOLID	<u>N/A</u>	<u>complete</u>		
95000202	BX-112	12 SAMPLE	S95T003743	0	ORGVOL01	SOLID	<u>N/A</u>	<u>0</u>		mL

Final page for worklist #

3662

CC 11-21-95
Analyst Signature Date

CC 11-21-95
Analyst Signature Date

Revised By John B. Bay 11-21-95

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist#

3663

Analyst: CC Instrument: BA000 Book # NA

Method: LO-160-103 Rev/Mod A-7

Worklist Comment: BX-112 95-AUG-048 RISER 2 EXTRUSION

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-----TEST-----	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	INSTCHK01				EXTRUD01	SOLID	<u>20</u>	<u>19.99</u>	<u>N/A</u>	
		2	INSTCHK02				EXTRUD01	SOLID	<u>500</u>	<u>499.71</u>	<u>N/A</u>	
95000202	BX-112	3	SAMPLE	S95T003744	0		DLIQVOL1	SOLID	<u>N/A</u>	<u>6</u>		mL
95000202	BX-112	4	SAMPLE	S95T003744	0		DLIQWT01	SOLID	<u>N/A</u>	<u>0</u>		g
95000202	BX-112	5	SAMPLE	S95T003744	0		EST.G/ML	SOLID	<u>N/A</u>	<u>0</u>		g/mL
95000202	BX-112	6	SAMPLE	S95T003744	0		EXTRUD01	SOLID	<u>N/A</u>	<u>complete</u>		
95000202	BX-112	7	SAMPLE	S95T003744	0		LLIQWT01	SOLID	<u>N/A</u>	<u><5</u>		g
95000202	BX-112	8	SAMPLE	S95T003744	0		NOTEBOOK	SOLID	<u>N/A</u>	<u>N-1148</u>		
95000202	BX-112	9	SAMPLE	S95T003744	0		SLDVOL01	SOLID	<u>N/A</u>	<u>NA</u>		mL
95000202	BX-112	10	SAMPLE	S95T003744	0		SLDWT-01	SOLID	<u>N/A</u>	<u>81.3</u>		g
95000202	BX-112	11	SAMPLE	S95T003744	0		APPEAR01	SOLID	<u>N/A</u>	<u>complete</u>		
95000202	BX-112	12	SAMPLE	S95T003744	0		ORGVOL01	SOLID	<u>N/A</u>	<u>6</u>		mL

Final page for worklist # **3663**

CC 11-21-95
Analyst Signature Date

CC 11-21-95
Analyst Signature Date

Reminded by Art B. B. 11-21-95

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WHC-SD-WM-DP-157, REV. 1

SAMPLE PREPARATIONS

LABCORE Data Entry Template for Worklist#

3686

Analyst: QRM Instrument: FUS01 37116355 Book # _____

Method: LA-549-141 Rev/Mod D-O

Worklist Comment: BX-112 FUSION01 3746->3747,3750->3751. RCJ

GROUP	PROJECT	S TYPE	SAMPLE#	R A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 BLNK-PREP			FUSION01	SOLID	<u>.250</u>	<u>.250</u>	N/A	g/L
95000202	BX-112	2 SAMPLE	S95T003747	0 F	FUSION01	SOLID	N/A	<u>2.2464</u>		g/L
			<u>.5616g</u>							
95000202	BX-112	3 SAMPLE	S95T003747	0	DOSE-02	SOLID	N/A	<u>4.5</u>		mrads/hour
95000202	BX-112	4 DUP	S95T003747	0 F	FUSION01	SOLID	<u>2.2464</u>	<u>2.4264</u>	N/A	g/L
			<u>.6066g</u>							
95000202	BX-112	5 DUP	S95T003747	0	DOSE-02	SOLID		<u>4</u>	N/A	mrads/hour
95000202	BX-112	6 SAMPLE	S95T003751	0 F	FUSION01	SOLID	N/A	<u>2.2512</u>		g/L
			<u>.5628g</u>							
95000202	BX-112	7 SAMPLE	S95T003751	0	DOSE-02	SOLID	N/A	<u>3.7</u>		mrads/hour
95000202	BX-112	8 DUP	S95T003751	0 F	FUSION01	SOLID	<u>2.2512</u>	<u>2.3524</u>	N/A	g/L
			<u>.5881g</u>							
95000202	BX-112	9 DUP	S95T003751	0	DOSE-02	SOLID		<u>3.8</u>	N/A	mrads/hour

Final page for worklist #

3686

QRM 11-21-95
Analyst Signature Date

HPT: Scott Corbaley

Day 11-22-95
Analyst Signature Date

Verified By M/L
11/22/95

Data Entry Comments:

20 ml - HCL
20 ml - H₂O₂
< 1% Solids
All Samples & QC.

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist#

3693

Analyst: OKM Instrument: FUS01 SR16355 Book # _____

Method: LA-549-141 Rev/Mod D-O

Worklist Comment: BX-112 FUSION01 3754->3755. RCJ

GROUP	PROJECT	S TYPE	SAMPLE#	R A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 BLNK-PREP			FUSION01	SOLID	<u>.250</u>	<u>.250</u>	N/A	g/L
95000202	BX-112	2 SAMPLE	S95T003755	0 F	FUSION01	SOLID	N/A	<u>2.4668</u>		g/L
			<u>.6167g</u>							
			<u>→ .250 l</u>							
95000202	BX-112	3 SAMPLE	S95T003755	0	DOSE-02	SOLID	N/A	<u>7</u>		mrad/hour
95000202	BX-112	4 DUP	S95T003755	0 F	FUSION01	SOLID	<u>2.4668</u>	<u>2.4084</u>	N/A	g/L
			<u>.6021g</u>							
			<u>→ .250 l</u>							
95000202	BX-112	5 DUP	S95T003755	0	DOSE-02	SOLID		<u>5</u>	N/A	mrad/hour

Final page for worklist # 3693

OKM 11-21-95
Analyst Signature Date

HPT - Scott Corbaley

[Signature] 11-22-95
Analyst Signature Date

Verified By ML
11/22/95

Data Entry Comments:

20 ml - HCl

20 ml - HNO₃

< 1% solids

All Sample & QC.

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WHC-SD-WM-DP-157, REV. 1

RADIOCHEMICAL ANALYSES

LABCORE Data Entry Template for Worklist# 3737

Analyst: SMF Instrument: AB00 15 Book# 150852

Method: LA-508-101 Rev/Mod D-2 WHC-SD-WM-DP-157, REV. 1

Worklist Comment: Determine sample size using Ludlum. SLF

S Type	Sample#	R A	Test	Matrix	Group#	Project
1 STD			@ALPHA01	SOLID		
2 BLNK-PREP			@ALPHA01	SOLID		
3 BLNK/BKG			@ALPHA01	SOLID		
4 SAMPLE	S95T003747	0 F	@ALPHA01	SOLID	95000202	BX-112
	Analytes Requested: ALPHA01 , ALPHA01E					
5 DUP	S95T003747	0 F	@ALPHA01	SOLID		

Final page for worklist # 3737

[Signature]
Analyst Signature

11-29-95
Date

[Signature]
Analyst Signature

11/29/95
Date

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Completed Worklist Report for Worklist# 3737

Analyst: smf Instrument: AB15 Book# _____

Method: _____ Rev/Mod _____ WHC-SD-WM-DP-157, REV. 1

Worklist Comment: Determine sample size using Ludlum. SLF

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0		@ALPHA01 ALPHA01	SOLID	1.28E-05	1.19E-5	92.970 %	Recovery
1	STD		0		@ALPHA01 ALPHA01E	SOLID	1.00	4.62E+00	4.620 %	Ct. Error
2	BLNK-PREP		0		@ALPHA01 ALPHA01	SOLID	1	<4.33E-3		uCi/g
2	BLNK-PREP		0		@ALPHA01 ALPHA01E	SOLID	1.00	4.93E+02	493.000 %	Ct. Error
3	BLNK/BKG		0		@ALPHA01 ALPHA01	SOLID	1.00E+00	1.32E+00	1.320	uCi/g
4	SAMPLE	S95T003747	0	F	@ALPHA01 ALPHA01	SOLID	N/A	1.87E-01	5.470e-003	uCi/g
4	SAMPLE	S95T003747	0	F	@ALPHA01 ALPHA01E	SOLID	N/A	8.30E+00	0.000 %	Ct. Error
5	DUP	S95T003747	0	F	@ALPHA01 ALPHA01	SOLID	1.87E-1	1.78E-1	4.930	RPD
5	DUP	S95T003747	0	F	@ALPHA01 ALPHA01E	SOLID	1.00	8.01E+00	8.010 %	Ct. Error

Final page for worklist# 3737

Analyst Signature _____ Date _____

Analyst Signature _____ Date _____


Reviewer Signature

11/30/95
Date

AT : LA-508-101 (D-2)

STANDARD

	STANDARD	REPLICATE
Type	DETECTOR NUMBER	15
STD	DISH SIZE (1, 2, or 5) (MS)	2
Work List	GROSS COUNTS (GC)	1969
3737	COUNT TIME in MINUTES (CT)	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.43
AT	SAMPLE SIZE in mL (SS)	10.000
Test Code	DILUTION FACTOR (DF)	1
@ALPHA01	STANDARD BOOK NUMBER (Std BN)	150B52
Matrix	EFFICIENCY FACTOR (EFF)	0.2380
LIQUID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	65.203
Batch Number	Standard Value in $\mu\text{Ci/mL}$	1.28E-05
95004193	Concentration in $\mu\text{Ci/L}$	1.23E-02
Rerun	Replicate Concentration in $\mu\text{Ci/L}$	1.15E-02
0	AVERAGE CONCENTRATION in $\mu\text{Ci/L}$	1.1921E-02

Sample Prep
N/A
Sample #
WORKLIST#3737-STD
Instrument Code
WB26872
Prepared By
CJO
Chemist
SLF
Analyst
SMF
Date Complete
11/29/95
Analysis Date
11/22/95
Analysis Time
10:00 PM
Sample Point
BX-112

$$Rs \text{ (Sample Count Rate)} = (TC / CT) - BKG$$

$$\text{ALPHA TOTAL } \mu\text{Ci/L} = Rs * 1000\text{mL/L} * DF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$$

$$\text{ALPHA TOTAL } \mu\text{Ci/mL} = \text{ALPHA TOTAL } \mu\text{Ci/L} / 1000\text{mL/L}$$

$$\text{Relative Counting Error} = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100$$

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL CONCENTRATION in $\mu\text{Ci/mL}$	1.19E-05	DETECTION LEVEL
RELATIVE COUNTING ERROR	= 4.6%	1.23E-07 $\mu\text{Ci/mL}$

Analyst:	CJO	Date: 29-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95

STANDARD.WB1 Rev. 1.0

508101ML

AT : LA-508-101 (D-2)

SOLIDS

		BLNK-PREP	REPLICATE
Type	DETECTOR NUMBER	15	15
BLNK-PREP	DISH SIZE (1, 2, or 5) (MS)	2	2
Work List	GROSS COUNTS (GC)	19	15
3737	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.43	0.43
AT	SAMPLE SIZE in mL (SS)	0.100	0.100
Test Code	DILUTION FACTOR (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.2464	2.2464
Matrix	EFFICIENCY FACTOR (EFF)	0.2380	0.2380
SOLID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	0.514	0.361
Batch Number			
95004193	Blank Concentration in $\mu\text{Ci/g}$	< 4.33E-03	
Rerun	Replicate Concentration in $\mu\text{Ci/g}$	< 3.04E-03	
0	Maximum Concentration in $\mu\text{Ci/g}$	< 4.3304E-03	
Sample Prep			
N/A	R_s (Sample Count Rate) = $(TC / CT) - BKG$		
Sample #	ALPHA TOTAL $\mu\text{Ci/g}$ = $R_s * 1000\text{mL/L} * DF / (EFF * SS * Dg/L * 2220000\text{dpm}/\mu\text{Ci})$		
S95T3747-BLNK			
Instrument Code	Relative Counting Error = $[(The\ Square\ Root\ of\ TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100$		
WB26872	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Prepared By			
CJO			
Chemist			
SLF	ALPHA TOTAL in $\mu\text{Ci/g}$	< 4.33E-03	DETECTION LEVEL
Analyst			
SMF	LESS THAN Value was Determined from Rmax.		
Date Complete			5.47E-03 $\mu\text{Ci/g}$
11/29/95	RELATIVE COUNTING ERROR	493.0%	
Analysis Date			
11/22/95			
Analysis Time			
10:00 PM			
Sample Point			
BX-112			

Analyst:

CJO

Date: 29-Nov-95

Signature of Chemist:

SLF

Date: 11/30/95

BLANK.WB1 Rev. 1.0

508101ML

AT : LA-508-101 (D-2)

SOLIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	15	15
SAMPLE	DISH SIZE (1, 2, or 5) (MS)	2	2
Work List	GROSS COUNTS (GC)	595	765
3737	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.43	0.43
AT	SAMPLE SIZE in mL (SS)	0.100	0.100
Test Code	DILUTION FACTOR (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.2464	2.2464
Matrix	EFFICIENCY FACTOR (EFF)	0.2380	0.2380
SOLID	Lc, Rmax, or Rs.(SAMPLE RATE) as APPROPRIATE	19.403	25.070
Batch Number			
95004193	Blank Concentration in $\mu\text{Ci/g}$	1.63E-01	
Rerun	Replicate Concentration in $\mu\text{Ci/g}$	2.11E-01	
0	Average Concentration in $\mu\text{Ci/g}$	1.8735E-01	
Sample Prep			
FUSION01	Rs (Sample Count Rate) = (TC / CT) - BKG		
Sample #	ALPHA TOTAL $\mu\text{Ci/g}$ = Rs * 1000mL/L * DF / (EFF * SS * Dg/L * 2220000dpm/ μCi)		
S95T003747			
Instrument Code	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100		
WB26872	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Prepared By			
CJO			
Chemist			
SLF	v RESULTS v		
Analyst	ALPHA TOTAL	in $\mu\text{Ci/g}$	1.87E-01
SMF			
Date Complete			
11/29/95	RELATIVE COUNTING ERROR	8.3%	
Analysis Date			
11/22/95			
Analysis Time			
10:00 PM			
Sample Point			
BX-112			

Analyst:	CJO	Date: 29-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95

SAMPLE WB1 Rev. 1.0

508101ML

WORKBOOK PAGE: DUP5

AT : LA-508-101 (D-2)

SOLIDS

		DUP	REPLICATE
Type	DETECTOR NUMBER	15	15
DUP	DISH SIZE (1, 2, or 5) (MS)	2	2
Work List	GROSS COUNTS (GC)	637	755
3737	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.43	0.43
AT	SAMPLE SIZE in mL (SS)	0.100	0.100
Test Code	DILUTION FACTOR (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.4264	2.4264
Matrix	EFFICIENCY FACTOR (EFF)	0.2380	0.2380
SOLID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	20.803	24.737
Batch Number			
95004193	Blank Concentration in $\mu\text{Ci/g}$	1.62E-01	
Rerun	Replicate Concentration in $\mu\text{Ci/g}$	1.93E-01	
0	Average Concentration in $\mu\text{Ci/g}$	1.7761E-01	
Sample Prep			
FUSION01	R_s (Sample Count Rate) = $(TC / CT) - BKG$		
Sample #	$\text{ALPHA TOTAL } \mu\text{Ci/g} = R_s * 1000\text{mL/L} * DF / (EFF * SS * Dg/L * 2220000\text{dpm}/\mu\text{Ci})$		
S95T003747			
Instrument Code	Relative Counting Error = $[(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100$		
WB26872	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Prepared By			
CJO			
Chemist			
SLF			
Analyst			
SMF			
Date Complete			
11/29/95			
Analysis Date			
11/22/95			
Analysis Time			
10:00 PM			
Sample Point			
BX-112			

		v RESULTS v	
ALPHA TOTAL	in $\mu\text{Ci/g}$	1.78E-01	DETECTION LEVEL
RELATIVE COUNTING ERROR		8.0%	5.07E-03 $\mu\text{Ci/g}$

Analyst:	CJO	Date: 29-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95
SAMPLE.WB1 Rev. 1.0	508101ML	

LABCORE Data Entry Template for Worklist# 3872

Analyst: AKL Instrument: AB00 18 Book# 152852 SLF 11/30/95
Method: LA-508-101 Rev/Mod D-2 150352

Worklist Comment: Determine sample size using Ludlum. SLF

S Type	Sample#	R A	Test	Matrix	Group#	Project
1 STD			@ALPHA01	SOLID		
2 BLNK-PREP			@ALPHA01	SOLID		
3 BLNK/BKG			@ALPHA01	SOLID		
4 SAMPLE	S95T003751	O F	@ALPHA01	SOLID	95000202	BX-112
	Analytes Requested: ALPHA01 , ALPHA01E					
5 DUP	S95T003751	O F	@ALPHA01	SOLID		
6 SPK	S95T003751	O F	@ALPHA01	SOLID		

Final page for worklist # 3872

AKL 11/28/95
Analyst Signature Date

C. J. Quinn 11/30/95
Analyst Signature Date

Data Entry Comments:

RPD acceptable due to low sample alpha activity. AKL 11/30/95

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WHC-SD-WM-DP-157, REV. 1

LABCORE Completed Worklist Report for Worklist# 3872

Analyst: aki Instrument: AB18 Book# _____

Method: _____ Rev/Mod _____

Worklist Comment: Determine sample size using Ludlum. SLF

Seq Type	Sample#	R A	Test	Matrix	Actual	Found	DL or Yield	Unit
1 STD		0	ALPHA01 ALPHA01	SOLID	1.28E-05	1.41E-5	110.160 %	Recovery
1 STD		0	ALPHA01 ALPHA01E	SOLID	1.00	4.44E+00	4.440 %	Ct. Error
2 BLNK-PREP		0	ALPHA01 ALPHA01	SOLID	1	<3.12E-3		uCi/g
2 BLNK-PREP		0	ALPHA01 ALPHA01E	SOLID	1.00	1.65E+02	165.000 %	Ct. Error
3 BLNK/BKG		0	ALPHA01 ALPHA01	SOLID	1.00E+00	2.31E+00	2.310	uCi/g
4 SAMPLE	S95T003751	0 F	ALPHA01 ALPHA01	SOLID	N/A	1.75E-01	3.800e-003	uCi/g
4 SAMPLE	S95T003751	0 F	ALPHA01 ALPHA01E	SOLID	N/A	8.51E+00	0.000 %	Ct. Error
5 DUP	S95T003751	0 F	ALPHA01 ALPHA01	SOLID	1.75E-1	2.19E-1	22.340	RPD
5 DUP	S95T003751	0 F	ALPHA01 ALPHA01E	SOLID	1.00	7.48E+00	7.480 %	Ct. Error
6 SPK	S95T003751	0 F	ALPHA01 ALPHA01	SOLID	3.92E-02	3.86E-02	98.470 %	Recovery

Final page for worklist# 3872

Analyst Signature _____ Date _____

Analyst Signature _____ Date _____


Reviewer Signature _____ Date 12/11/95

AT : LA-508-101 (D-2)

STANDARD

	STANDARD	REPLICATE
Type	DETECTOR NUMBER	18
STD	DISH SIZE (1, 2, or 5) (MS)	2
Work List	GROSS COUNTS (GC)	1978
3872	COUNT TIME in MINUTES (CT)	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.13
AT	SAMPLE SIZE in mL (SS)	10.000
Test Code	DILUTION FACTOR (DF)	1
@ALPHA01	STANDARD BOOK NUMBER (Std BN)	150B52
Matrix	EFFICIENCY FACTOR (EFF)	0.2095
LIQUID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	65.803
Batch Number	Standard Value in $\mu\text{Ci/mL}$	1.28E-05
95004364	Concentration in $\mu\text{Ci/L}$ =	1.41E-02
Rerun	Replicate Concentration in $\mu\text{Ci/L}$ =	1.40E-02
0	AVERAGE CONCENTRATION in $\mu\text{Ci/L}$ =	1.4098E-02
Sample Prep		
N/A	R_s (Sample Count Rate) = $(TC / CT) - BKG$	
Sample #	ALPHA TOTAL $\mu\text{Ci/L}$ = $R_s * 1000\text{mL/L} * DF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$	
WORKLIST#3872-STD	ALPHA TOTAL $\mu\text{Ci/mL}$ = ALPHA TOTAL $\mu\text{Ci/L} / 1000\text{mL/L}$	
Instrument Code	Relative Counting Error = $[(\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100$	
WB27809	Detection Levels and Less Than Values are determined from Procedure LA-508-002.	
Prepared By		
CJO		
Chemist		
SLF	ALPHA TOTAL CONCENTRATION in $\mu\text{Ci/mL}$	1.41E-05
Analyst		DETECTION LEVEL
AKL		
Date Complete		8.55E-08
11/30/95	RELATIVE COUNTING ERROR =	4.4%
Analysis Date		
11/29/95		
Analysis Time		
02:00 PM		
Sample Point		
BX-112		

Analyst:	CJO	Date: 30-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95
STANDARD.WB1 Rev. 1.0	508101ML	

AT : LA-508-101 (D-2)

SOLIDS

		BLNK-PREP	REPLICATE
Type	DETECTOR NUMBER	18	18
BLNK-PREP	DISH SIZE (1, 2, or 5) (MS)	2	2
Work List	GROSS COUNTS (GC)	10	8
3872	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.13	0.13
AT	SAMPLE SIZE in mL (SS)	0.100	0.100
Test Code	DILUTION FACTOR (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.2512	2.2512
Matrix	EFFICIENCY FACTOR (EFF)	0.2095	0.2095
SOLID	Lc, Rmax, or Rs.(SAMPLE RATE) as APPROPRIATE	0.203	0.326
Batch Number			
95004364	Blank Concentration in $\mu\text{Ci/g}$	1.94E-03	
Rerun	Replicate Concentration in $\mu\text{Ci/g}$	< 3.12E-03	
0	Maximum Concentration in $\mu\text{Ci/g}$	< 3.1174E-03	
Sample Prep			
N/A	Rs (Sample Count Rate) = (TC / CT) - BKG		
Sample #	ALPHA TOTAL $\mu\text{Ci/g}$ = Rs * 1000mL/L * DF / (EFF * SS * Dg/L * 2220000dpm/ μCi)		
S95T3751-BLNK			
Instrument Code	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100		
WB27809	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Prepared By			
CJO			
Chemist			
SLF			
Analyst			
AKL			
Date Complete			
11/30/95			
Analysis Date			
11/29/95			
Analysis Time			
02:00 PM			
Sample Point			
BX-112			

v RESULTS v		DETECTION LEVEL
ALPHA TOTAL	in $\mu\text{Ci/g}$ < 3.12E-03	
LESS THAN Value was Determined from Rs.		
RELATIVE COUNTING ERROR	164.9%	3.80E-03 $\mu\text{Ci/g}$

Analyst:

CJO

Date: 30-Nov-95

Signature of Chemist:

SLF

Date: 11/30/95

BLANK.WB1 Rev. 1.0

508101ML

AT : LA-508-101 (D-2)

SOLIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	18	18
SAMPLE	DISH SIZE (1, 2, or 5) (MS)	2	2
Work List	GROSS COUNTS (GC)	542	563
3872	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.13	0.13
AT	SAMPLE SIZE in mL (SS)	0.100	0.100
Test Code	DILUTION FACTOR (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.2512	2.2512
Matrix	EFFICIENCY FACTOR (EFF)	0.2095	0.2095
SOLID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	17.937	18.637
Batch Number			
95004364	Blank Concentration in $\mu\text{Ci/g}$	1.71E-01	
Rerun	Replicate Concentration in $\mu\text{Ci/g}$	1.78E-01	
0	Average Concentration in $\mu\text{Ci/g}$	1.7466E-01	
Sample Prep			
FUSION01	Rs (Sample Count Rate) = (TC / CT) - BKG		
Sample #	ALPHA TOTAL $\mu\text{Ci/g}$ = $R_s \cdot 1000\text{mL/L} \cdot \text{DF} / (\text{EFF} \cdot \text{SS} \cdot \text{Dg/L} \cdot 2220000\text{dpm}/\mu\text{Ci})$		
S95T003751			
Instrument Code	Relative Counting Error = $[(\text{The Square Root of TC} + \text{BKG} \cdot \text{CT}) / (\text{TC} - \text{BKG} \cdot \text{CT})] \cdot 1.96 \cdot 100$		
WB27809	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Prepared By			
CJO			
Chemist	v RESULTS v		
SLF	ALPHA TOTAL in $\mu\text{Ci/g}$	1.75E-01	DETECTION LEVEL
Analyst			
AKL			
Date Complete			3.80E-03
11/30/95	RELATIVE COUNTING ERROR	8.5%	$\mu\text{Ci/g}$
Analysis Date			
11/29/95			
Analysis Time			
02:00 PM			
Sample Point			
BX-112			

Analyst:	CJO	Date: 30-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95

SAMPLE.WB1 Rev. 1.0

508101ML

AT : LA-508-101 (D-2)

SOLIDS

		DUP	REPLICATE
Type	DETECTOR NUMBER	18	18
DUP	DISH SIZE (1, 2, or 5) (MS)	2	2
Work List	GROSS COUNTS (GC)	746	699
3872	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.13	0.13
AT	SAMPLE SIZE in mL (SS)	0.100	0.100
Test Code	DILUTION FACTOR (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.3524	2.3524
Matrix	EFFICIENCY FACTOR (EFF)	0.2095	0.2095
SOLID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	24.737	23.170
Batch Number			
95004364	Blank Concentration in $\mu\text{Ci/g}$	2.26E-01	
Rerun	Replicate Concentration in $\mu\text{Ci/g}$	2.12E-01	
0	Average Concentration in $\mu\text{Ci/g}$	2.1894E-01	
Sample Prep			
FUSION01	R_s (Sample Count Rate) = $(TC / CT) - BKG$		
Sample #	$\text{ALPHA TOTAL } \mu\text{Ci/g} = R_s * 1000\text{mL/L} * DF / (EFF * SS * \text{Dg/L} * 2220000\text{dpm}/\mu\text{Ci})$		
S95T003751			
Instrument Code	Relative Counting Error = $[(\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100$		
WB27809	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Prepared By			
CJO			
Chemist			
SLF	ν RESULTS ν		
Analyst	ALPHA TOTAL in $\mu\text{Ci/g}$	2.19E-01	DETECTION LEVEL
AKL			
Date Complete			3.64E-03 $\mu\text{Ci/g}$
11/30/95	RELATIVE COUNTING ERROR	7.5%	
Analysis Date			
11/29/95			
Analysis Time			
02:00 PM			
Sample Point			
BX-112			

Analyst:	CJO	Date: 30-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95
SAMPLE.WB1 Rev. 1.0	504101ML	

WORKBOOK PAGE: SPIKE6

AT : LA-508-101 (D-2) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	18	18
SPK	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	53723	55150
3872	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.13	0.13
AT	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	0.100
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.2512	2.2512
Matrix	SPIKE VOLUME in mL (SVol)	0.100	0.100
SOLID	SPIKE DILUTION FACTOR (SDF)	1	1
Batch Number	SPIKE BOOK NUMBER (Spk BN)	119B43	119B43
95004364	SPIKE VALUE in $\mu\text{Ci/mL}$ (SVal)	3.9219E-02	3.9219E-02
Rerun	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.2095	0.2095
0	SAMPLE + SPIKE $\mu\text{Ci/g}$ (S+S)	1.71E+01	1.76E+01
Sample Prep	AVERAGE or MAXIMUM $\mu\text{Ci/g}$ in SAMPLE	1.7466E-01	
FUSION01			
Sample #			
S95T003751			
Instrument Code			
WB27809			
Prepared By			
CJO			
Chemist			
SLF			
Analyst			
AKL			
Date Complete			
11/30/95			
Analysis Date			
11/29/95	QC ACTUAL	=	3.92E-02
Analysis Time	QC FOUND	=	3.86E-02
02:00 PM	AVG. PERCENT SPIKE RECOVERY	=	98.5%
Sample Point			
BX-112			

R_s (Sample Count Rate) = $(TC / CT) - BKG$
 $SAMPLE + SPIKE \mu\text{Ci/g} = R_s * 1000\text{mL/L} * DF / (EFF * SS * Dg/L * 2220000\text{dpm}/\mu\text{Ci})$
 $QC \text{ ACTUAL} = SVal$
 $QC \text{ FOUND} = (((S+S \mu\text{Ci/g} - SAMPLE \mu\text{Ci/g}) * ((SDF/(SVol*1000))/(DF/SS/Dg/L))))$
 $PERCENT \text{ SPIKE RECOVERY} = (QC \text{ FOUND} / QC \text{ ACTUAL}) * 100$

Analyst:	CJO	Date: 30-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95

SPIKE.WB1 Rev. 1.0
 508101ML

BX112

LABCORE Data Entry Template for Worklist# 3873

Analyst: SMF Instrument: AB00 15 Book# 150 B52
Method: LA-508-101 Rev/Mod D-2 WHC-SD-WM-DF-152, REV. 1
Worklist Comment: Determine sample size using Ludlum. SLF

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@ALPHA01	SOLID		
2	BLNK-PREP				@ALPHA01	SOLID		
3	BLNK/BKG				@ALPHA01	SOLID		
4	SAMPLE	S95T003755	0	F	@ALPHA01	SOLID	95000202	BX-112
		Analytes Requested: ALPHA01 , ALPHA01E						
5	DUP	S95T003755	0	F	@ALPHA01	SOLID		

Final page for worklist # 3873

SMF 11-29-95
Analyst Signature Date

C. J. Quinn 11/29/95
Analyst Signature Date

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Completed Worklist Report for Worklist# 3873

Analyst: smf Instrument: AB15 Book# _____

Method: _____ Rev/Mod _____ WHC-SD-WM-DP-157, REV. 1

Worklist Comment: Determine sample size using Ludlum. SLF

Seq Type	Sample#	R A	Test	Matrix	Actual	Found	DL or Yield	Unit
1 STD		0	@ALPHA01 ALPHA01	SOLID	1.28E-05	1.19E-5	92.970 %	Recovery
1 STD		0	@ALPHA01 ALPHA01E	SOLID	1.00	4.62E+00	4.620 %	Ct. Error
2 BLNK-PREP		0	@ALPHA01 ALPHA01	SOLID	1	<4.24E-3		uCi/g
2 BLNK-PREP		0	@ALPHA01 ALPHA01E	SOLID	1.00	4.93E+02	493.000 %	Ct. Error
3 BLNK/BKG		0	@ALPHA01 ALPHA01	SOLID	1.00E+00	1.36E+00	1.360	uCi/g
4 SAMPLE	S95T003755	0 F	@ALPHA01 ALPHA01	SOLID	N/A	1.83E-01	4.980e-003	uCi/g
4 SAMPLE	S95T003755	0 F	@ALPHA01 ALPHA01E	SOLID	N/A	7.73E+00	0.000 %	Ct. Error
5 DUP	S95T003755	0 F	@ALPHA01 ALPHA01	SOLID	1.83E-1	1.70E-1	7.370	RPD
5 DUP	S95T003755	0 F	@ALPHA01 ALPHA01E	SOLID	1.00	7.92E+00	7.920 %	Ct. Error

Final page for worklist# 3873

Analyst Signature _____ Date _____

Analyst Signature _____ Date _____


Reviewer Signature _____ Date 11/30/95

AT : LA-508-101 (D-2)

STANDARD

	STANDARD	REPLICATE
Type	DETECTOR NUMBER	15
STD	DISH SIZE (1, 2, or 5) (MS)	2
Work List	GROSS COUNTS (GC)	1969
3873	COUNT TIME in MINUTES (CT)	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.43
AT	SAMPLE SIZE in mL (SS)	10.000
Test Code	DILUTION FACTOR (DF)	1
@ALPHA01	STANDARD BOOK NUMBER (Std BN)	150B52
Matrix	EFFICIENCY FACTOR (EFF)	0.2380
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE	65.203
Batch Number	Standard Value in $\mu\text{Ci/mL}$	1.28E-05
95004367	Concentration in $\mu\text{Ci/L}$	1.23E-02
Rerun	Replicate Concentration in $\mu\text{Ci/L}$	1.15E-02
0	AVERAGE CONCENTRATION in $\mu\text{Ci/L}$	1.1921E-02
Sample Prep		
N/A	Rs (Sample Count Rate) = (TC / CT) - BKG	
Sample #	ALPHA TOTAL $\mu\text{Ci/L}$ = Rs * 1000mL/L * DF / (EFF * SS * 2220000dpm/ μCi)	
WORKLIST#3873-STD	ALPHA TOTAL $\mu\text{Ci/mL}$ = ALPHA TOTAL $\mu\text{Ci/L}$ / 1000mL/L	
Instrument Code	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100	
WB26872	Detection Levels and Less Than Values are determined from Procedure LA-508-002.	
Prepared By		
CJO		
Chemist		
SLF	ALPHA TOTAL CONCENTRATION in $\mu\text{Ci/mL}$	1.19E-05
Analyst		
SMF		
Date Complete		
11/29/95	RELATIVE COUNTING ERROR	4.6%
Analysis Date		
11/22/95		
Analysis Time		
10:00 PM		
Sample Point		
BX-112		

Analyst:	CJO	Date: 29-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95

STANDARD.WB1 Rev. 1.0

508101ML

AT : LA-508-101 (D-2)

SOLIDS

		BLNK-PREP	REPLICATE
Type	DETECTOR NUMBER	15	15
BLNK-PREP	DISH SIZE (1, 2, or 5) (MS)	2	2
Work List	GROSS COUNTS (GC)	20	15
3873	COUNT TIME in MINUTES (CT)	30	30
AT	BACKGROUND in cpm (BKG)	0.43	0.43
AT	SAMPLE SIZE in mL (SS)	0.100	0.100
Test Code	DILUTION FACTOR (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.4668	2.4668
Matrix	EFFICIENCY FACTOR (EFF)	0.2380	0.2380
SOLID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	0.552	0.361
Batch Number			
95004367	Blank Concentration in $\mu\text{Ci/g}$	< 4.24E-03	
Replicate	Replicate Concentration in $\mu\text{Ci/g}$	< 2.77E-03	
0	Maximum Concentration in $\mu\text{Ci/g}$	< 4.2363E-03	
Sample Prep			
N/A	R_s (Sample Count Rate) = $(TC / CT) - BKG$		
Sample	ALPHA TOTAL $\mu\text{Ci/g}$ = $R_s * 1000\text{mL/L} * DF / (EFF * SS * Dg/L * 2220000\text{dpm}/\mu\text{Ci})$		
S95T3755-BLNK			
Instrument Code	Relative Counting Error = $[(\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100$		
WB26872	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Prepared By			
CJO			
Chemist			
SLF	ALPHA TOTAL in $\mu\text{Ci/g}$	< 4.24E-03	DETECTION LEVEL
Analyst			
SMF	LESS THAN Value was Determined from Rmax.		
Date Complete			4.98E-03 $\mu\text{Ci/g}$
11/29/95	RELATIVE COUNTING ERROR	493.0%	
Analysis Date			
11/22/95			
Analysis Time			
10:00 PM			
Sample Point			
BX-112			

Analyst:	CJO	Date: 29-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95
BLANK.WB1 Rev. 1.0	508/01ML	

AT : LA-508-101 (D-2)

SOLIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	15	15
SAMPLE	DISH SIZE (1, 2, or 5) (MS)	2	2
Work List	GROSS COUNTS (GC)	773	681
3873	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.43	0.43
AT	SAMPLE SIZE in mL (SS)	0.100	0.100
Test Code	DILUTION FACTOR (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.4668	2.4668
Matrix	EFFICIENCY FACTOR (EFF)	0.2380	0.2380
SOLID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	25.337	22.270
Batch Number			
95004367	Blank Concentration in $\mu\text{Ci/g}$	1.94E-01	
Rerun	Replicate Concentration in $\mu\text{Ci/g}$	1.71E-01	
0	Average Concentration in $\mu\text{Ci/g}$	1.8263E-01	
Sample Prep			
FUSION01	R_s (Sample Count Rate) = $(TC / CT) - BKG$		
Sample #	ALPHA TOTAL $\mu\text{Ci/g}$ = $R_s * 1000\text{mL/L} * DF / (EFF * SS * Dg/L * 2220000\text{dpm}/\mu\text{Ci})$		
S95T003755			
Instrument Code	Relative Counting Error = $[(The\ Square\ Root\ of\ TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100$		
WB26872	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Prepared By			
CJO			
Chemist			
SLF	ALPHA TOTAL	in $\mu\text{Ci/g}$	1.83E-01
Analyst			
SMF			
Date Complete			
11/29/95	RELATIVE COUNTING ERROR	7.7%	4.98E-03 $\mu\text{Ci/g}$
Analysis Date			
11/22/95			
Analysis Time			
10:00 PM			
Sample Point			
BX-112			

Analyst:	CJO	Date: 29-Nov-95
Signature of Chemist:	SLF	Date:

SAMPLE.WB1 Rev. 1.0

508101ML

WORKBOOK PAGE: DUP5

AT : LA-508-101 (D-2) SOLIDS

		DUP	REPLICATE
Type	DETECTOR NUMBER	15	15
DUP	DISH SIZE (1, 2, or 5) (MS)	2	2
Work List	GROSS COUNTS (GC)	675	650
3873	COUNT TIME in MINUTES (CT)	30	30
AT or TB ?	BACKGROUND in cpm (BKG)	0.43	0.43
AT	SAMPLE SIZE in mL (SS)	0.100	0.100
Test Code	DILUTION FACTOR (DF)	1	1
@ALPHA01	DIGEST GRAMS of SOLIDS / L (Dg/L)	2.4084	2.4084
Matrix	EFFICIENCY FACTOR (EFF)	0.2380	0.2380
SOLID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE	22.070	21.237
Batch Number			
95004367	Blank Concentration in $\mu\text{Ci/g}$	1.73E-01	
Rerun	Replicate Concentration in $\mu\text{Ci/g}$	1.67E-01	
0	Average Concentration in $\mu\text{Ci/g}$	1.7016E-01	
Sample Prep			
FUSION01	R_s (Sample Count Rate) = $(TC / CT) - BKG$		
Sample #	ALPHA TOTAL $\mu\text{Ci/g}$ = $R_s * 1000\text{mL/L} * DF / (EFF * SS * Dg/L * 2220000\text{dpm}/\mu\text{Ci})$		
S95T003755			
Instrument Code	Relative Counting Error = $[(The\ Square\ Root\ of\ TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100$		
WB26872	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Prepared By			
CJO			
Chemist			
SLF	ALPHA TOTAL in $\mu\text{Ci/g}$	1.70E-01	DETECTION LEVEL
Analyst			
SMF			
Date Complete	RELATIVE COUNTING ERROR	7.9%	5.10E-03 $\mu\text{Ci/g}$
11/29/95			
Analysis Date			
11/22/95			
Analysis Time			
10:00 PM			
Sample Point			
BX-112			

Analyst:	CJO	Date: 29-Nov-95
Signature of Chemist:	SLF	Date: 11/30/95

SAMPLE.WB1 Rev. 1.0 508101ML



Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

PART II

WHC-SD-WM-DP- 157 REV. 1

WHC-SD-WM-DP-157, REV. 0

ANALYTICAL SERVICES

45-DAY SAFETY SCREENING RESULTS FOR TANK 241-BX-112,
AUGER SAMPLES 95-AUG-047 AND 95-AUG 048

DATE PRINTED:

NOVEMBER 30, 1995

TABLE OF CONTENTS

Narrative	1
Sample Data Summary	6
Inorganic Analyses	9
Differential Scanning Calorimetry (DSC)	
DSC Worklist # 3729	10
DSC Worklist # 3735	14
DSC Worklist # 4000	20
Thermogravimetric Analysis (TGA)	
TGA Worklist # 3730	21
TGA Worklist # 3734	25
TGA Worklist # 4003	31

This document consists of pages 1 through 35.

WHC-SD-WM-DP-157, REV. 1

WHC-SD-WM-DP-157, REV. 0

NARRATIVE

45-DAY SAFETY SCREENING REPORT FOR TANK 241-BX-112,
AUGER SAMPLES 95-AUG-047 AND 95-AUG-048

ANALYTICAL SUMMARY

Two auger samples were taken from tank 241-BX-112 (BX-112). The samples were received at the 222-S Laboratories and underwent safety screening analyses, consisting of differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), bulk density, and determination of total alpha activity. As appropriate, the results were compared to the safety screening limits at a confidence level of 95%. All analytical results were within the action limits stated in the SAP.

Based on the results of vapor monitoring prior to sampling, the BX-112 vapor space is far below the lower explosive limit (LEL). None of the data indicate that the tank is "unsafe" when compared to the criteria (energetics, criticality, and flammability) in the *Safety Screening Data Quality Objective* (Dukelow, et al., 1995). However, the tank cannot be declared "safe," as two full length profiles were not obtained by auger sampling. Core sampling will be necessary to fully satisfy the DQO.

Any additional analyses on the BX-112 auger samples will be included in a revision to this report.

SCOPE

This document serves as the 45-day report deliverable for the tank BX-112 auger samples collected on November 16 and 17, 1995 (samples 95-AUG-047 and 95-AUG-048). The 222-S Laboratories received, extruded, and analyzed each sample in accordance with the SAP [1]. Included in this report are the primary safety screening results obtained from the analyses, and copies of all DSC and TGA raw data scans as requested in the SAP. The results of tank dome space flammability screening are also included.

No additional testing to support safety screening analyses for these auger samples is required. Any additional analyses conducted by the 222-S Laboratories on these auger samples will be included in a revision to this report.

TANK DOME SPACE FLAMMABILITY SCREENING

Prior to auger sampling, the vapor space of tank BX-112 was screened for flammability issues. The results of combustible gas monitoring inside riser 3 of tank BX-112 are presented in Table 1. This measurement is conducted in the field and recorded in the work package (work package for BX-112 auger sampling is #ES-95-00217). The results indicated that the tank vapor space was at 0% of the LEL, far below the action limit of 10% stated in the DQO [2].

Table 1. Characteristics of BX-112 Vapor Space as Determined by Combustible Gas Monitoring.

Measurement	Result
Lower Explosive Limit (LEL)	0%
Oxygen (O ₂)	20.9%
Total Organic Carbon (TOC)	11.3 ppm
Ammonia (NH ₃)	125 ppm

SAMPLE RECEIPT, EXTRUSION, AND SUBSAMPLING95-AUG-047

Auger sample 95-AUG-047 was collected from riser 3 of tank BX-112 on November 16, 1995, and extruded on November 21, 1995. This was a 50 cm (20 inch) auger sampler, with 39 flutes (this was the first time that this auger was used. It has twice as many flutes as the typical auger). The sample appeared fairly homogeneous. The waste was a very wet, light-brown sludge, which tended to drip from the auger onto the extrusion tray. Flutes 1-8 at the top of the auger were bare. The material on flutes 9-16 appeared slightly less wet than the lower portion of the sample. The material on flutes 9-16, totaling 45.8 grams, was segregated as the upper half-segment solids. Flutes 17-39 contained lumpy sludge (lumps disappeared upon subsampling). A total of 165.2 grams was subsampled as the lower half-segment solids. The half segment subsamples were homogenized and subsampled for further laboratory analyses, bulk density determination, and archiving.

95-AUG-048

Auger sample 95-AUG-048 was collected from riser 2 of Tank BX-112 on November 17, 1995, and extruded on November 21. This was a 50 cm (20 inch) auger sampler, with 19 flutes. The sample appeared to be a homogeneous, medium-brown, very wet sludge. Flutes 1-6 were bare. The sample was recovered on flutes 7-19, and mostly dripped off of the auger onto the extrusion tray. Due to the apparent length of the sample recovered [30 cm (12 inches)], the moderate-to-low recovery (81.3 g), and the apparent homogeneity, the sample was not subsampled into half segments, but homogenized and subsampled at the whole-segment level. Portions were then subsampled for bulk density determination and further laboratory analyses and archiving.

ANALYTICAL RESULTS

BULK DENSITY

Three subsamples were submitted for bulk density determination by centrifugation in a tared, graduated, vial per procedure LA-160-103, Rev. A-7. The results ranged from 1.31 to 1.35 g/cm³. These results are presented in the summary tables. In order to conserve sample, duplicate analyses were not conducted.

THERMOGRAVIMETRIC ANALYSIS (TGA)

Three samples were submitted for moisture content determination by TGA per procedures LA-560-112, Rev. B-2, or LA-514-114, Rev. C-1 (a different procedure is used for each instrument). The samples were analyzed in duplicate. The results are presented in the summary tables, and the raw data scans are attached. All results were between 55.59 and 65.50 percent moisture. The relative percent difference (RPD) between sample and duplicate results for sample S95T003746 was 11.4%, which slightly exceeded the criterion of less than 10% given in the SAP. Inspection of the raw data (attached) indicates that the sample and duplicate scans are similar in shape, except that the weight loss for the sample result appears to begin at approximately 100 °C, instead of at ambient temperature. The chemist attributed this to static charge holding the sample tray to the side of the furnace [3]. Once the static charge was overcome, the weight loss scan appears very similar in shape to the scan of the duplicate sample (although the endpoint differs by almost 7 weight percent). The sample was rerun in duplicate. The RPD for the rerun was 1.71%. Both the original results and the results of the rerun are included in the summary tables. The results of the rerun are noted by a "1" next to the sample number.

DIFFERENTIAL SCANNING CALORIMETRY (DSC)

Three samples were submitted for determination of energetics by DSC per procedure LA-514-113, Rev. C-1 or procedure LA-514-114, Rev. C-1. The samples were analyzed in duplicate. The results are presented in the summary tables, and the raw data scans are attached. None of the samples exhibited exotherms. Since none of the samples exhibited any exotherms, the statistical calculation of an upper 95% confidence level for each sample is unnecessary.

ALPHA TOTAL

Three solids samples were submitted for total alpha analysis per procedure LA-508-101, Rev. D-2. The samples were fused per procedure LA-549-141, Rev. D-0 prior to analysis. Two fusions were prepared per sample (for duplicate results). Each fused dilution was analyzed twice; the results were averaged and reported as one value. The highest result returned was 0.219 µCi/g, more than two orders of magnitude below the action limit of 41 µCi/g. The upper 95% confidence level for each sample has been calculated and is presented in Table 2. All of the adjusted results are far below the action limit of 41

$\mu\text{Ci/g}$ stated in the SAP. The RPD for sample S95T003751 was 22.3%. However, no rerun was deemed necessary, as the 95% confidence limit upper value for this sample was 0.336 $\mu\text{Ci/g}$, far below the action limit of 41 $\mu\text{Ci/g}$.

The alpha results reported by the lab are calculated assuming a density of 1.5 g/cm^3 for solid samples. As the bulk density results recorded for these samples are all below 1.5 g/cm^3 , the alpha results reported remain conservative per the calculation described in the SAP [1].

One of the two standards run with these samples exhibited a recovery slightly outside the range specified in the SAP (110.2%). Since the result was so close to being within range, and the sample results were far below the limit, a rerun was deemed unnecessary. This result was well within the method control limits of 72.3-125.9%. All quality control results are presented in the summary tables.

Table 2. Comparison of Total Alpha Results at a Confidence Level of 95%.

Sample Description/ Sample Number	Sample Result	Duplicate Result	Mean	Var(Mean)	Upper 95% Confidence Limit
AUG-047 UH S95T003747	0.187	0.178	0.182	2.025E-05	0.211
AUG-047 LH S95T003751	0.175	0.219	0.197	4.84E-04	0.336
AUG-048 WS S95T003755	0.183	0.170	0.176	4.23E-05	0.218
AUG-047, AUG-048 combined	-	-	0.183 (weighted mean)	5.12E-05	0.228

Notes: var(mean) - variance of the mean; UH - upper half;
LH - lower half; WS - whole segment;
weighted mean - average for each auger given equal weight

REFERENCES

- [1] J. M. Conner, *Tank 241-BX-112 Auger Sampling and Analysis Plan*, WHC-SD-WM-TSAP-051, Rev. 0A, Westinghouse Hanford Company, Richland, Washington, November 15, 1995.
- [2] G. T. Dukelow, et al., *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington, August 31, 1995.
- [3] Personal Communication with B. D. Valenzuela, December 1, 1995.

WHC-SD-WM-DP-157, REV. 1

WHC-SD-WM-DP-157, REV. 0

SAMPLE DATA SUMMARY

INTERIM

45-Day Report for Auger Samples 95-AUG-047, 95-AUG-048
BX-112

CORE NUMBER: 95-AUG-047, 95-AUG-048
SEGMENT #: 95-AUG-047

SEGMENT PORTION: U Upper Half of Segment

Sample#	R	A#	Analyte	Unit	Action Limits		Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
					Lower	Upper										
S95T003745			Bulk Density of Sample	g/mL	None	None	n/a	n/a	1.350	n/a	n/a	n/a	n/a	5.00e-01		n/a
S95T003746	1		% Water by TGA on Perkin Elmer	%	None	None	101.0	n/a	60.72	61.77	61.25	1.71	n/a	n/a		n/a
S95T003746			% Water by TGA on Perkin Elmer	%	None	None	100.5	n/a	55.59	62.30	58.95	11.4	n/a	n/a		n/a
S95T003746			DSC Exotherm on Perkin Elmer	Joules/g	-1.0e+01	480.0	99.97	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a		n/a
S95T003746			DSC Exotherm Dry Calculated	Joules/g Dry	-1.0e+01	480.0	n/a	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a		n/a
S95T003747	F		Alpha of Digested Solid	uCi/g	-1.0e+01	41.01	92.97	<4.33e-03	1.87e-01	1.78e-01	1.82e-01	4.93	n/a	5.47e-03		8.30E+00

L Lower Half of Segment: L Lower Half of Segment

Sample#	R	A#	Analyte	Unit	Action Limits		Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
					Lower	Upper										
S95T003749			Bulk Density of Sample	g/mL	None	None	n/a	n/a	1.310	n/a	n/a	n/a	n/a	5.00e-01		n/a
S95T003750			% Water by TGA on Perkin Elmer	%	None	None	100.5	n/a	63.37	63.52	63.45	0.24	n/a	n/a		n/a
S95T003750			DSC Exotherm on Perkin Elmer	Joules/g	-1.0e+01	480.0	99.97	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a		n/a
S95T003750			DSC Exotherm Dry Calculated	Joules/g Dry	-1.0e+01	480.0	n/a	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a		n/a
S95T003751	F		Alpha of Digested Solid	uCi/g	-1.0e+01	41.01	110.2	<3.12e-03	1.75e-01	2.19e-01	1.97e-01	22.3	98.47	3.80e-03		8.51E+00

=> Limit violated
=> Selected Limit

WHC-SD-WM-DP-157, REV. 1
WHC-SD-WM-DP-157, REV. 0

INTERIM

45-Day Report for Auger Samples 95-AUG-047, 95-AUG-048
BX-112

CORE NUMBER: 95-AUG-047, 95-AUG-048
SEGMENT #: 95-AUG-048

SEGMENT PORTION: W Whole Segment

Sample#	R	A#	Analyte	Unit	Action Limits		Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
					Lower	Upper									
S95T003753			Bulk Density of Sample	g/mL	None	None	n/a	n/a	1.310	n/a	n/a	n/a	n/a	5.00e-01	n/a
S95T003754			% Water by TGA using Mettler	%	None	None	100.5	n/a	65.42	65.50	65.46	0.12	n/a	n/a	n/a
S95T003754			DSC Exotherm Dry Calculated	Joules/g Dry	-1.0e+01	480.0	n/a	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S95T003754			DSC Exotherm using Mettler	Joules/g	-1.0e+01	480.0	92.44	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S95T003755	F		Alpha of Digested Solid	uCi/g	-1.0e+01	41.01	92.97	<4.24e-03	1.83e-01	1.70e-01	1.76e-01	7.37	n/a	4.98e-03	7.73E+00

=> Limit Violated
=> Selected Limit

50

INTERIM

WHC-SD-WM-DP-157, REV. 1
WHC-SD-WM-DP-157, REV. 0

WHC-SD-WM-DP- 157, REV. 1

WHC-SD-WM-DP-157, REV. 0

INORGANIC ANALYSES

LABCORE Data Entry Template for Worklist#

3729

Analyst: SMF Instrument: DSC01 DSC01 Book # 12N14A
Method: LA-514-113 Rev/Mod C-1 WHC-SD-WM-DP- 157, REV. 1
Worklist Comment: BX-112 DSC PLease run under N2. PRIORITY.

GROUP	PROJECT	S TYPE	SAMPLE#	R A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 STD			DSC-01	SOLID	<u>28.45</u>	<u>26.3</u>	<u>N/A</u>	Joules/g
95000202	BX-112	2 SAMPLE	S95T003754	0	DSC-01	SOLID	<u>N/A</u>	<u>0</u>		Joules/g
95000202	BX-112	3 DUP	S95T003754	0	DSC-01	SOLID	<u>0</u>	<u>0</u>	<u>N/A</u>	Joules/g

Final page for worklist # 3729

Ann Furrer 11/21/95
Analyst Signature Date

RLH 11/22/95
Analyst Signature Date

Verified by Blandina Valenzuela
11/27/95

Data Entry Comments:

Sample has another endotherm besides water endotherm at 249 °C with a
value of 3.89 J/g in sample & dup. SMF

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 53 TO 55

DSC STD 12N14A

8.020 mg

Rate: 10.0 °C/min

File: 00015.001

Ident: 0.0

DSC METTLER 21-Nov-95

222-S Laboratory

exo >

10. mW

Integration

Delta H 211 mJ

26.3 J/g

Peak 157.7 °C

-15.5 mW

WHC-SD-WM-DP-157, REV. 1

WHC-SD-WM-DP-157, REV. 0

120.

140.

160.

180.

Signature 11-21-95

S95T003754 N2

29.920 mg

Rate: 10.0 °C/min

File: 00022.001

DSC METTLER

21-Nov-95

Ident: 0.0

222-S Laboratory

exo

Integration

Delta H 112 mJ

3.8 J/g

Peak 249.4°C

-1.5 mW

Integration

Delta H 26855 mJ

897.6 J/g

Peak 107.3°C

-91.4 mW

50. mW

S4

WHC-SD-WM-DP-157, REV. 1

WHC-SD-WM-DP-157, REV. 0

100.

200.

300.

400.

°C

S95T003754 DUP N2

27.237 mg

Rate: 10.0 °C/min

File: 00024.001

DSC METTLER

21-Nov-95

Ident: 0.0

222-S Laboratory

exo >

Integration

Delta H 103 mJ

3.8 J/g

Peak 251.4 °C

-1.4 mW

Integration

Delta H 31580 mJ

1159.4 J/g

Peak 105.3 °C

-91.8 mW

50. mW

100.

200.

300.

400.

°C

WHC-SD-WM-DP-157, REV. 1

WHC-SD-WM-DP-157, REV. 0

WHC-SD-WM-DP-157, REV. 0
LABCORE Data Entry Template for Worklist#

3735

Analyst: SME Instrument: DSC01 DSC03 Book # 12N4A

Method: LA-514-114 Rev/Mod C-1

WHC-SD-WM-DP-157, REV. 1

Worklist Comment: PE BX112 DSC

GROUP	PROJECT	S TYPE	SAMPLE#	R A	-----TEST-----	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 STD			DSC-03	SOLID	<u>28.45</u>	<u>28.44</u>	<u>N/A</u>	Joules/g
95000202	BX-112	2 SAMPLE	S95T003746	0	DSC-03	SOLID	<u>N/A</u>	<u>0</u>		Joules/g
95000202	BX-112	3 DUP	S95T003746	0	DSC-03	SOLID	<u>0</u>	<u>0</u>	<u>N/A</u>	Joules/g
95000202	BX-112	4 SAMPLE	S95T003750	0	DSC-03	SOLID	<u>N/A</u>	<u>0</u>		Joules/g
95000202	BX-112	5 DUP	S95T003750	0	DSC-03	SOLID	<u>0</u>	<u>0</u>	<u>N/A</u>	Joules/g

Final page for worklist #

3735

[Signature] 11/21/95
Analyst Signature Date

[Signature]
Analyst Signature Date

Verified by Blandina
Valenzuela
11/27/95

S95T003746 produced an endotherm at 119.6°C with a delta H of 1464.2 J/g

Data Entry Comments:

S95T003750 produced an endotherm at ^{11/27/95} ~~118.9~~ 113.8°C
with a delta H of 1333.3 J/g

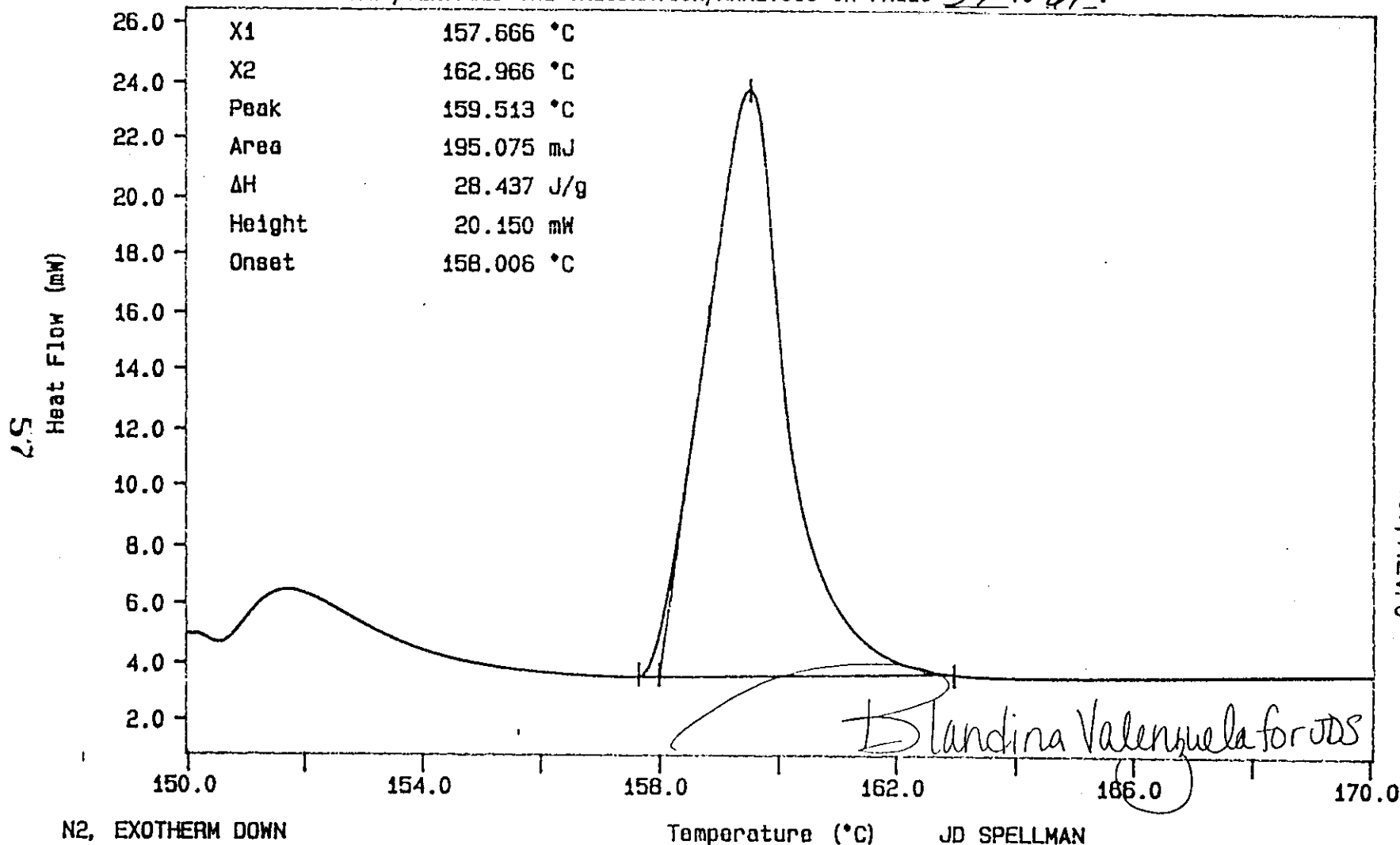
Curve 1: DSC

File info: IND112101 Tue Nov 21 07:55:04 1995

Sample Weight: 6.860 mg

12N14A Indium at 10C/min

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 37 TO 41.



N2, EXOTHERM DOWN

TEMP1: 150.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min
TEMP2: 170.0 °C

Temperature (°C)

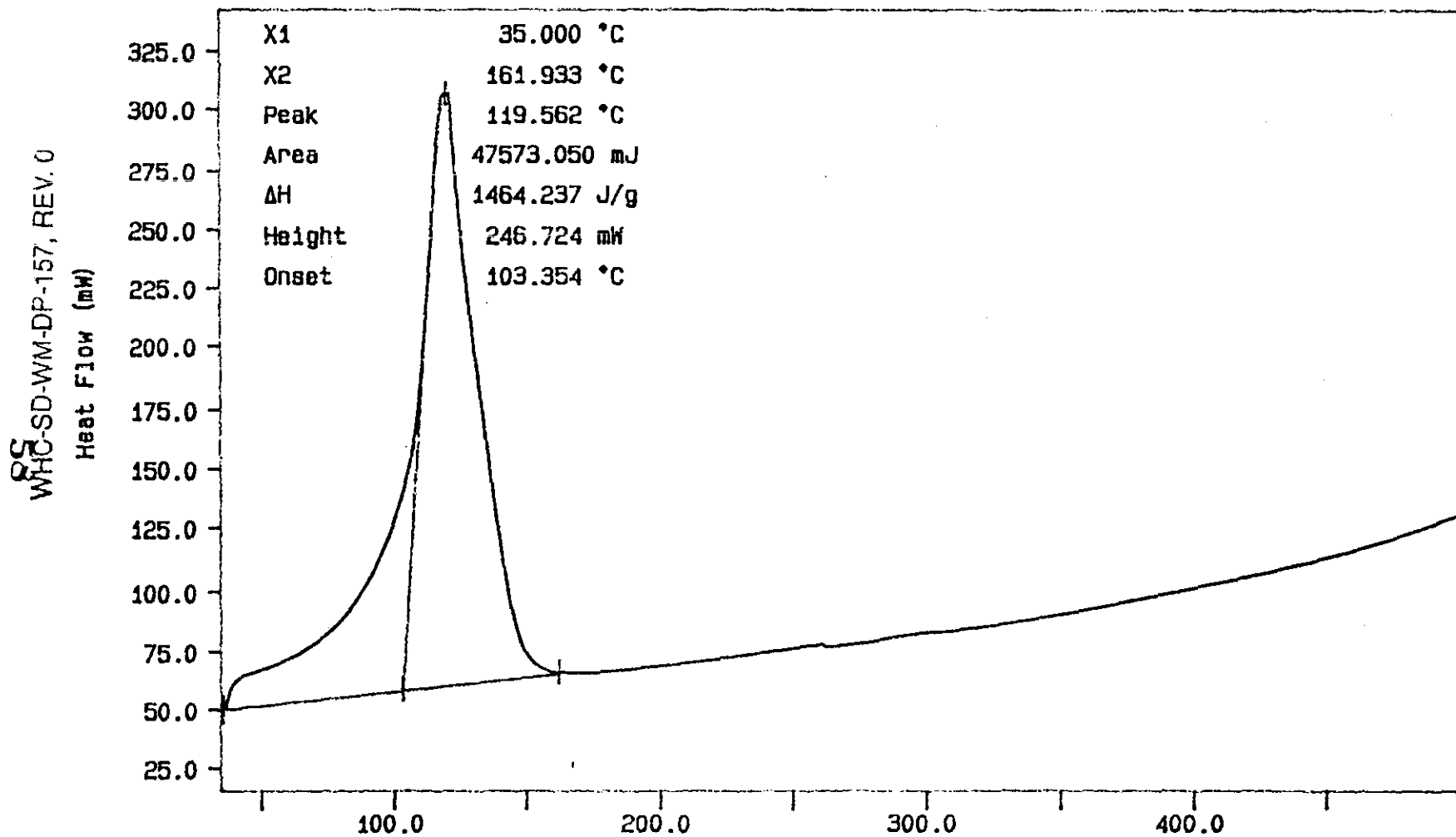
JD SPELLMAN
PERKIN-ELMER
7 Series Thermal Analysis System
Tue Nov 21 17:32:38 1995

Curve 1: DSC

File info: SAM112103 Tue Nov 21 18:26:33 1995

Sample Weight: 32.490 mg

S95T003746



exotherm down, N2 purge gas

TEMP1: 35.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min
TEMP2: 400.0 °C

Temperature (°C)

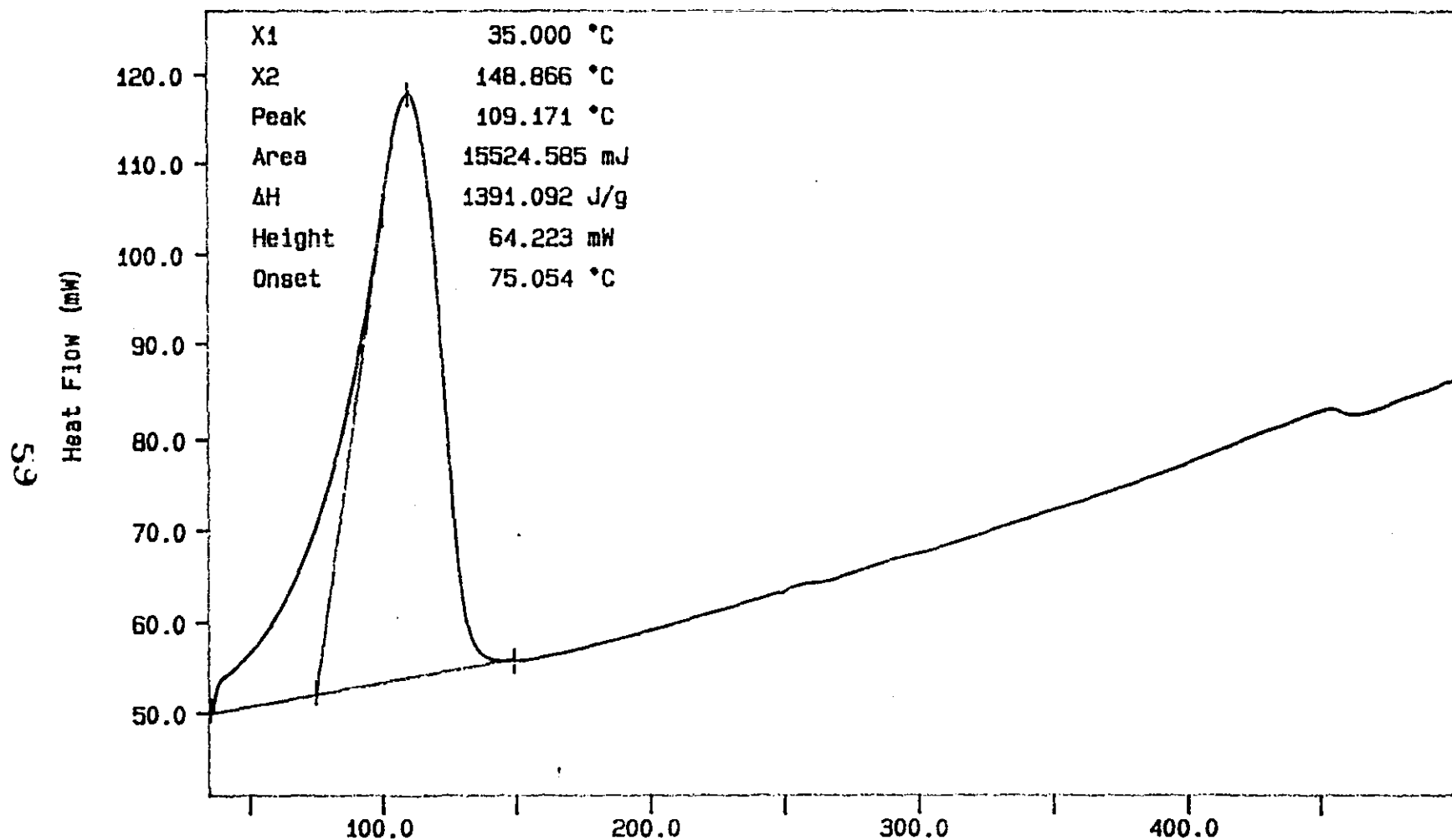
SM FULTON
PERKIN-ELMER
7 Series Thermal Analysis System
Tue Nov 21 20:14:51 1995

Curve 1: DSC

File info: SAM112104 Tue Nov 21 21:05:32 1995

Sample Weight: 11.160 mg

S95T003746 DUP



exotherm down, N2 purge gas

TEMP1: 35.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min
TEMP2: 400.0 °C

Temperature (°C)

SM FULTON
PERKIN-ELMER
7 Series Thermal Analysis System
Tue Nov 21 21:09:18 1995

WHC-SD-WM-DP-157, REV. 0

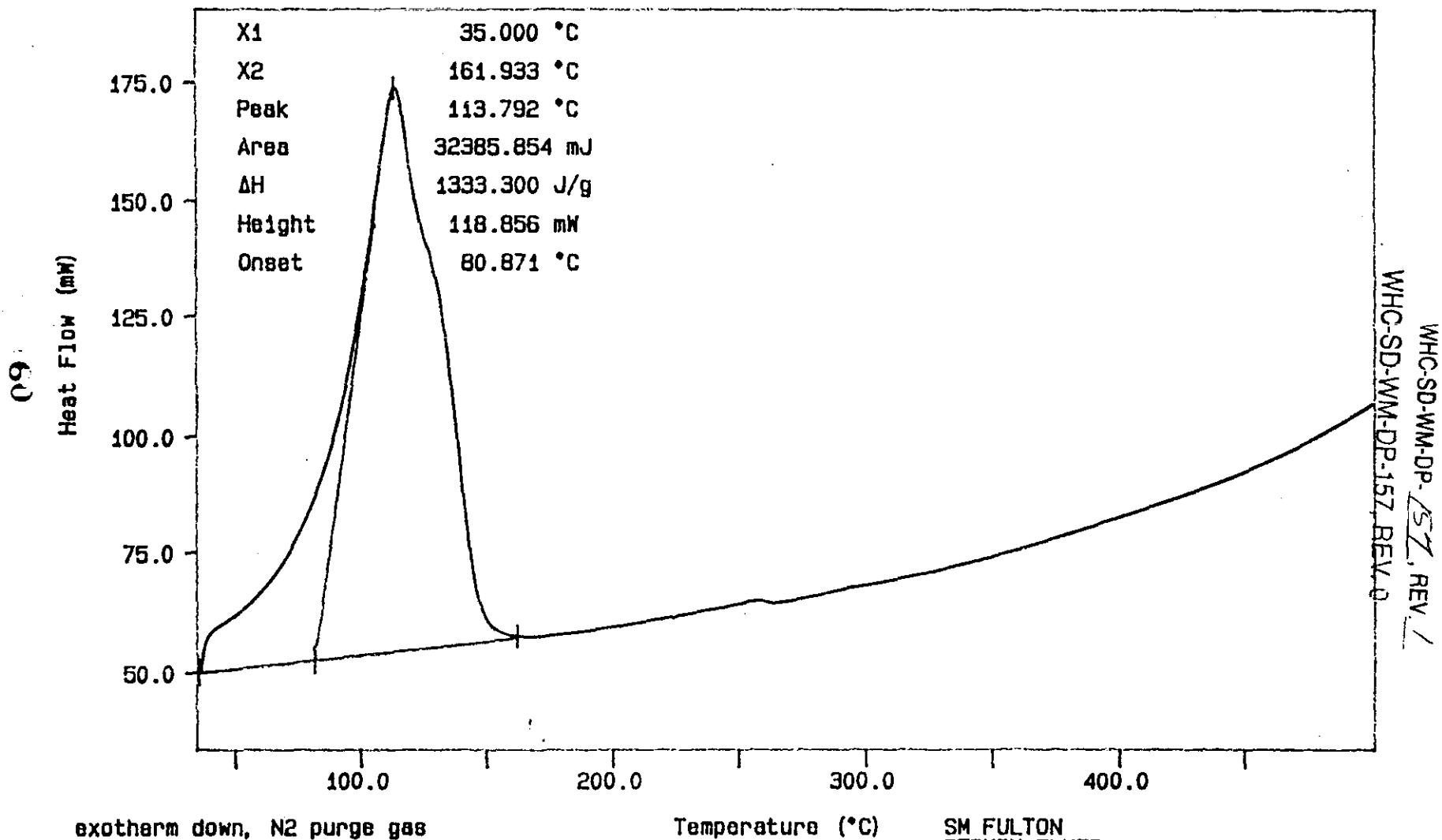
WHC-SD-WM-DP-157, REV. 1

Curve 1: DSC

File info: SAM112105 Tue Nov 21 22: 19: 21 1995

Sample Weight: 24.290 mg

S95T003750



TEMP1: 35.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min
TEMP2: 500.0 °C

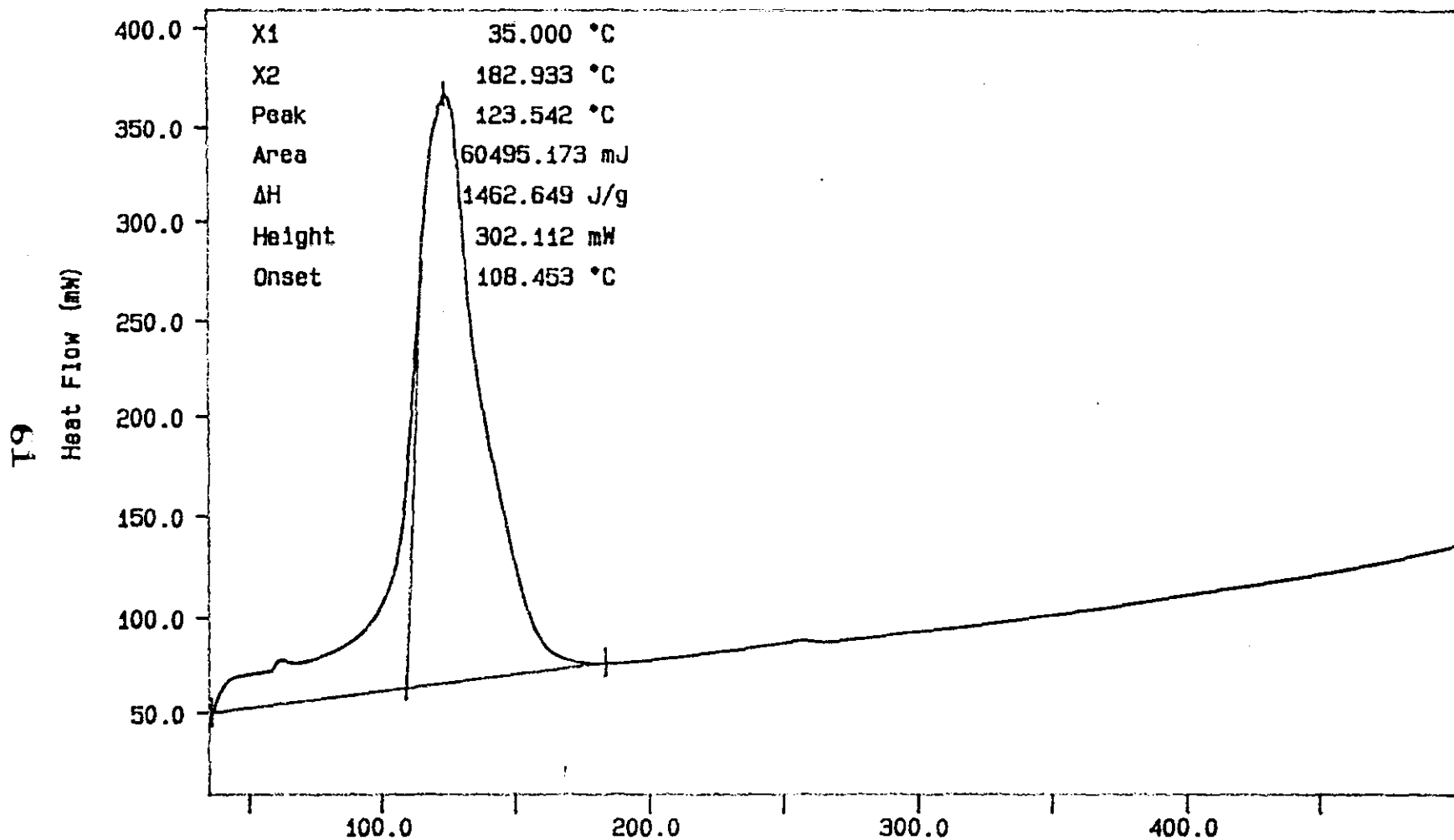
SM FULTON
PERKIN-ELMER
7 Series Thermal Analysis System
Tue Nov 21 22: 24: 53 1995

Curve 1: DSC

File info: SAM112106 Tue Nov 21 23:21:17 1995

Sample Weight: 41.360 mg

S95T003750 DUP



WHC-SD-WM-DP-157, REV. 0

exotherm down, N2 purge gas

TEMP1: 50.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min
TEMP2: 500.0 °C

Temperature (°C)

SM FULTON
PERKIN-ELMER
7 Series Thermal Analysis System
Wed Nov 22 00:25:42 1995

LABCORE Data Entry Template for Worklist#

4000

Analyst: BDV Instrument: DSC01 Book #

Method: LA-514-113 Rev/Mod

WHC-SD-WM-DP- 157, REV. 1

Worklist Comment: Dry DSCs for BX-112. bdv

GROUP	PROJECT	S TYPE	SAMPLE#	R A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
95000202	BX-112	1 SAMPLE	S95T003746	0	DSC-02	SOLID	N/A	Ø		Joules/g Dry
95000202	BX-112	2 DUP	S95T003746	0	DSC-02	SOLID	Ø	Ø	N/A	Joules/g Dry
95000202	BX-112	3 SAMPLE	S95T003750	0	DSC-02	SOLID	N/A	Ø		Joules/g Dry
95000202	BX-112	4 DUP	S95T003750	0	DSC-02	SOLID	Ø	Ø	N/A	Joules/g Dry
95000202	BX-112	5 SAMPLE	S95T003754	0	DSC-02	SOLID	N/A	Ø		Joules/g Dry
95000202	BX-112	6 DUP	S95T003754	0	DSC-02	SOLID	Ø	Ø	N/A	Joules/g Dry

Final page for worklist #

4000

Data entered + verified by
Blandina Valenzuela 12/1/95
Analyst Signature Date

Analyst Signature Date

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist#

3730

Analyst: SME Instrument: TGA01 TGA01 Book # 65103A

Method: LA-560-112 Rev/Mod B-1 WHC-SD-WM-DP-157, REV. 1

Worklist Comment: BX-112 TGA. Please run under N2. PRIORITY.

GROUP	PROJECT	S TYPE	SAMPLE#	R A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 STD			TGA-01	SOLID	<u>59.74</u>	<u>60.05</u>	<u>N/A</u>	%
95000202	BX-112	2 SAMPLE	S95T003754	0	TGA-01	SOLID	<u>N/A</u>	<u>65.42</u>		%
95000202	BX-112	3 DUP	S95T003754	0	TGA-01	SOLID	<u>65.42</u>	<u>65.50</u>	<u>N/A</u>	%

Final page for worklist #

3730

John L. ... 11/21/95
Analyst Signature Date

R. H. ... 11/22/95
Analyst Signature Date

Verified by Blandina Valenzuela
11/27/95

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 64 TO 66.

TGA STD 65N8A

60.764 mg

Rate: 10.0 °C/min

File: 00014.001

TG

METTLER

21-Nov-95

Ident: 0.0

222-S Laboratory

Step Analysis

Height-36.49 mg

-60.05 %

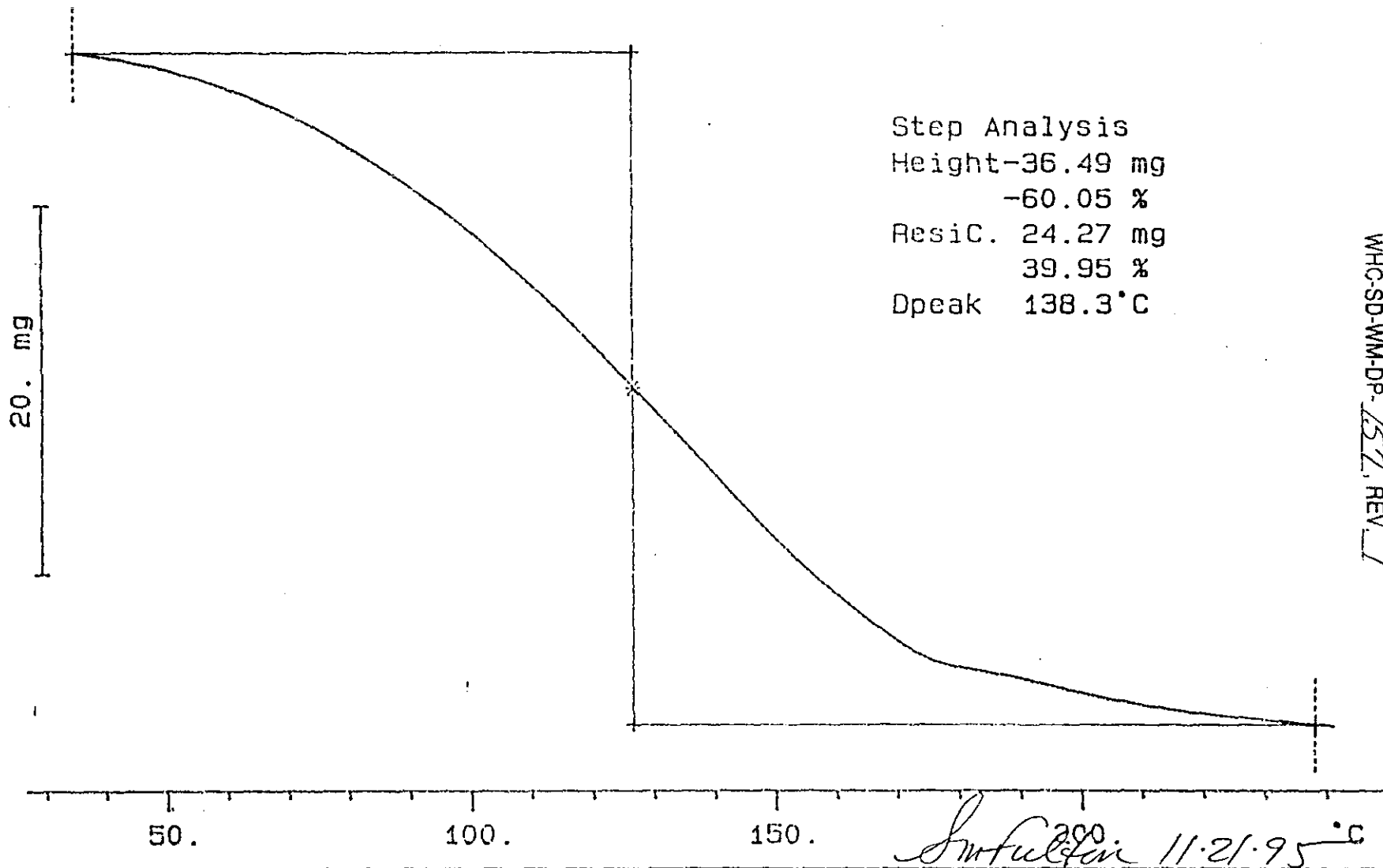
Resid. 24.27 mg

39.95 %

Dpeak 138.3 °C

WHC-SD-WM-DP-157, REV. 1

WHC-SD-WM-DP-157, REV. 1



S95T003754 N2

22.232 mg

Rate: 10.0 °C/min

File: 00023.001 TG METTLER 21-Nov-95

Ident: 0.0

222-S Laboratory

Step Analysis

Height-14.54 mg

-65.42 %

ResiC. 7.69 mg

34.58 %

Dpeak 93.0 °C

5. mg

100.

200.

300.

400.

°C

65

WHC-SD-WM-DP-157, REV. 1

WHC-SD-WM-DP-157, REV. 0

S95T003754 DUP N2

18.988 mg

Rate: 10.0 °C/min

File: 00025.001

TG

METTLER

21-Nov-95

Ident: 0.0

222-S Laboratory

Step Analysis

Height-12.44 mg

-65.50 %

Resid. 6.55 mg

34.50 %

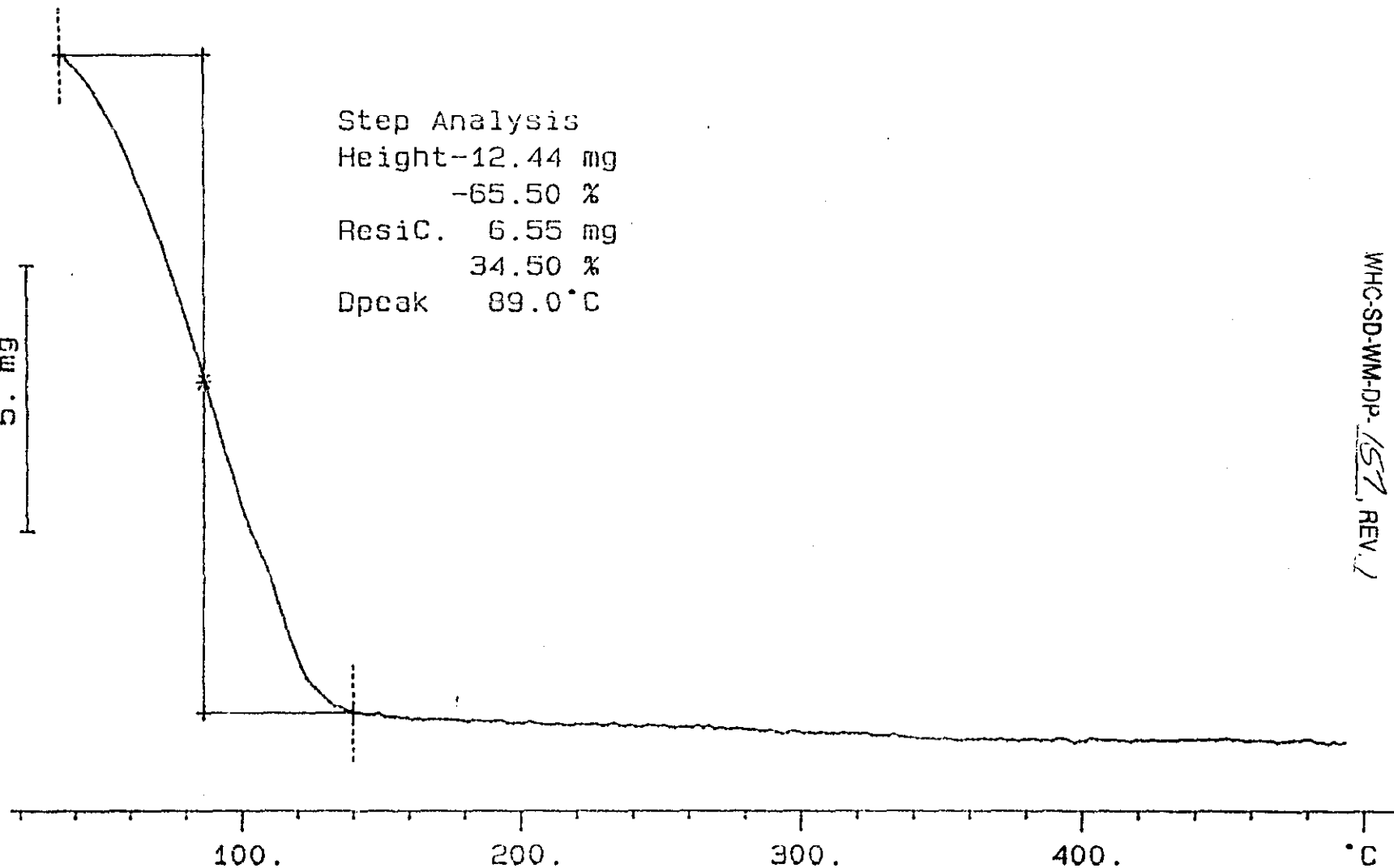
Dpeak 89.0 °C

99

5. mg

WHC-SD-WM-DP-157, REV. 1

WHC-SD-WM-DP-157, REV. 0



LABCORE Data Entry Template for Worklist#

3734

Analyst: SmF Instrument: TGA01 TGA03 Book # 65N3A

Method: LA-514-114 Rev/Mod C-1

Worklist Comment: PE BX-112 tga

WHC-SD-WM-DP-157, REV. 1

GROUP	PROJECT	S TYPE	SAMPLE#	R A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 STD			TGA-03	SOLID	<u>59.74</u>	<u>60.04</u>	<u>N/A</u>	%
95000202	BX-112	2 SAMPLE	S95T003746	0	TGA-03	SOLID	<u>N/A</u>	<u>55.59</u>		%
95000202	BX-112	3 DUP	S95T003746	0	TGA-03	SOLID	<u>55.59</u>	<u>62.30</u>	<u>N/A</u>	%
95000202	BX-112	4 SAMPLE	S95T003750	0	TGA-03	SOLID	<u>N/A</u>	<u>63.37</u>		%
95000202	BX-112	5 DUP	S95T003750	0	TGA-03	SOLID	<u>63.37</u>	<u>63.52</u>	<u>N/A</u>	%

Final page for worklist #

3734

Janet J. for Suzie Fulton 11/21/95
Analyst Signature Date

FDH 11/22/95
Analyst Signature Date

Verified by Blandina Valenzuela
11/27/95

S95T003746: the flat portion of the thermogram is due to static
Data Entry Comments: electricity between the sample pan and the furnace
the sample will be run again.

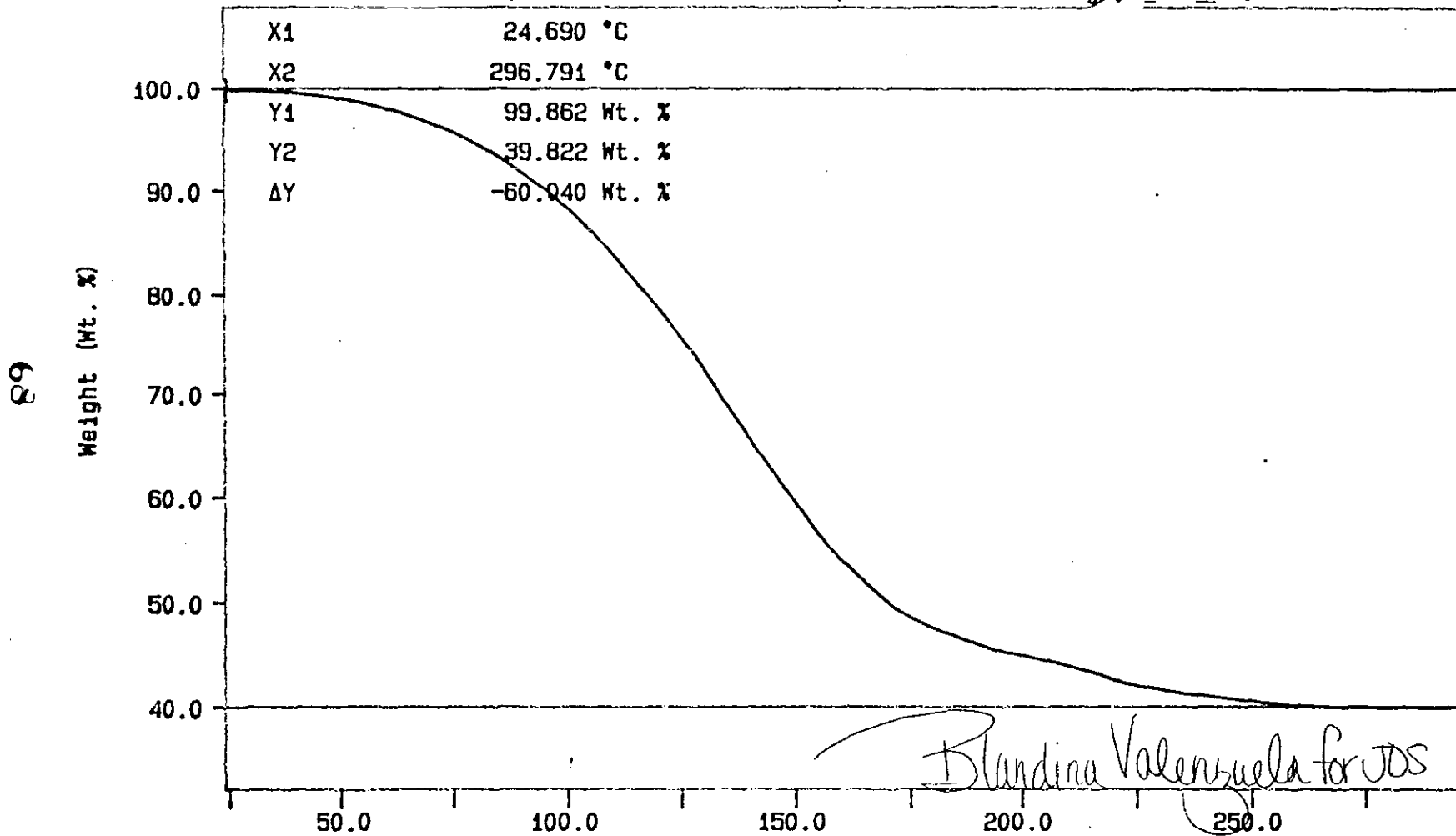
Curve 1: TGA

File info: TER112101 Tue Nov 21 07:47:10 1995

Sample Weight: 24.173 mg

65N8-A Terliq

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 68 TO 72



WHC-SD-WM-DP-157, REV.0

WHC-SD-WM-DP-157, REV.1

N2 10C/MIN

TEMP1: 30.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min
TEMP2: 300.0 °C

Temperature (°C)

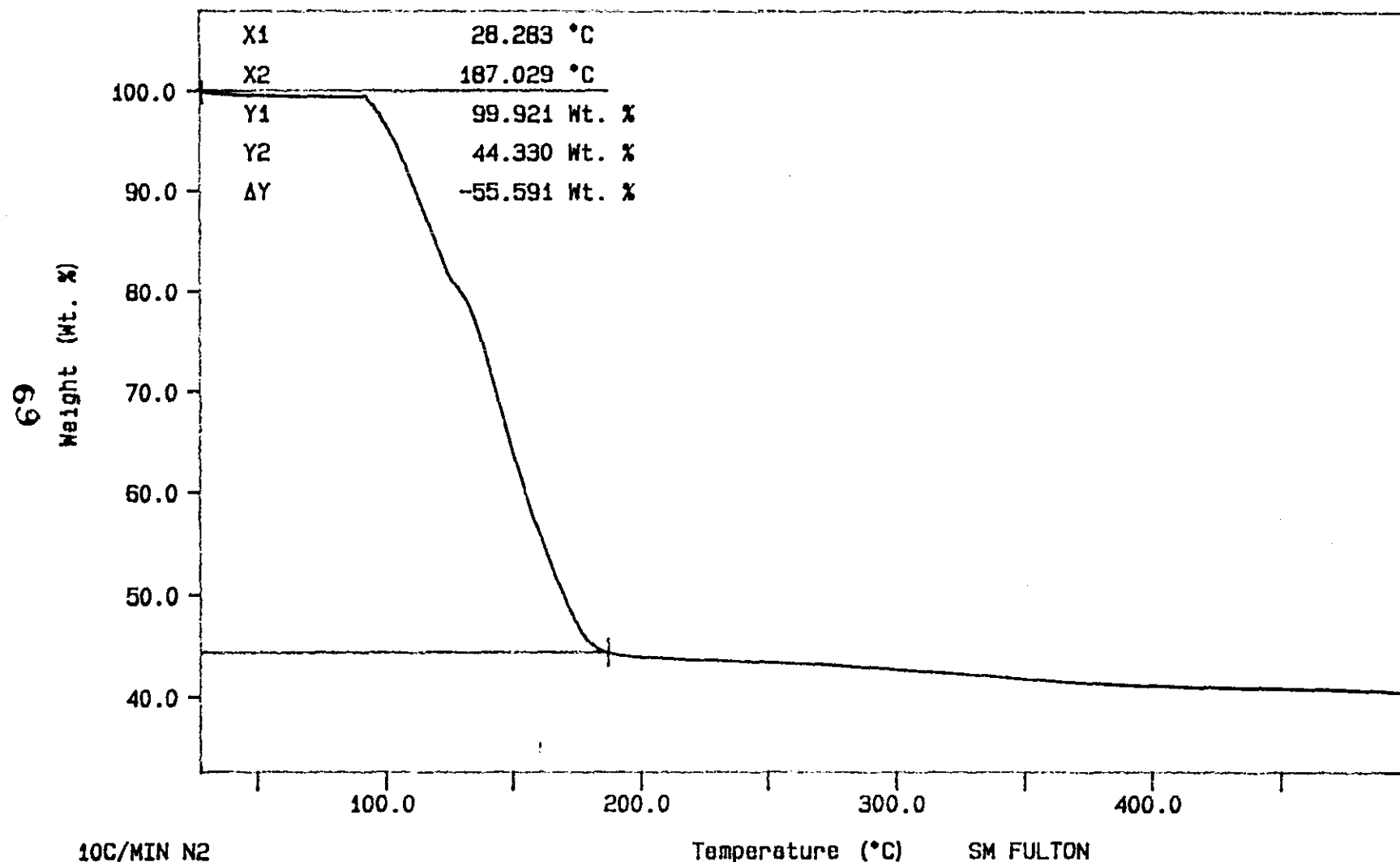
JD SPELLMAN
PERKIN-ELMER
7 Series Thermal Analysis System
Tue Nov 21 17:39:44 1995

Curve 1: TGA

File info: SAM112103 Tue Nov 21 18:30:51 1995

Sample Weight: 32.917 mg

S95T003746



10C/MIN N2
TEMP1: 20.0 C
TEMP2: 500.0 C
TIME1: 0.0 min
RATE1: 10.0 C/min

SM FULTON
PERKIN-ELMER
7 Series Thermal Analysis System
Tue Nov 21 19:04:17 1995

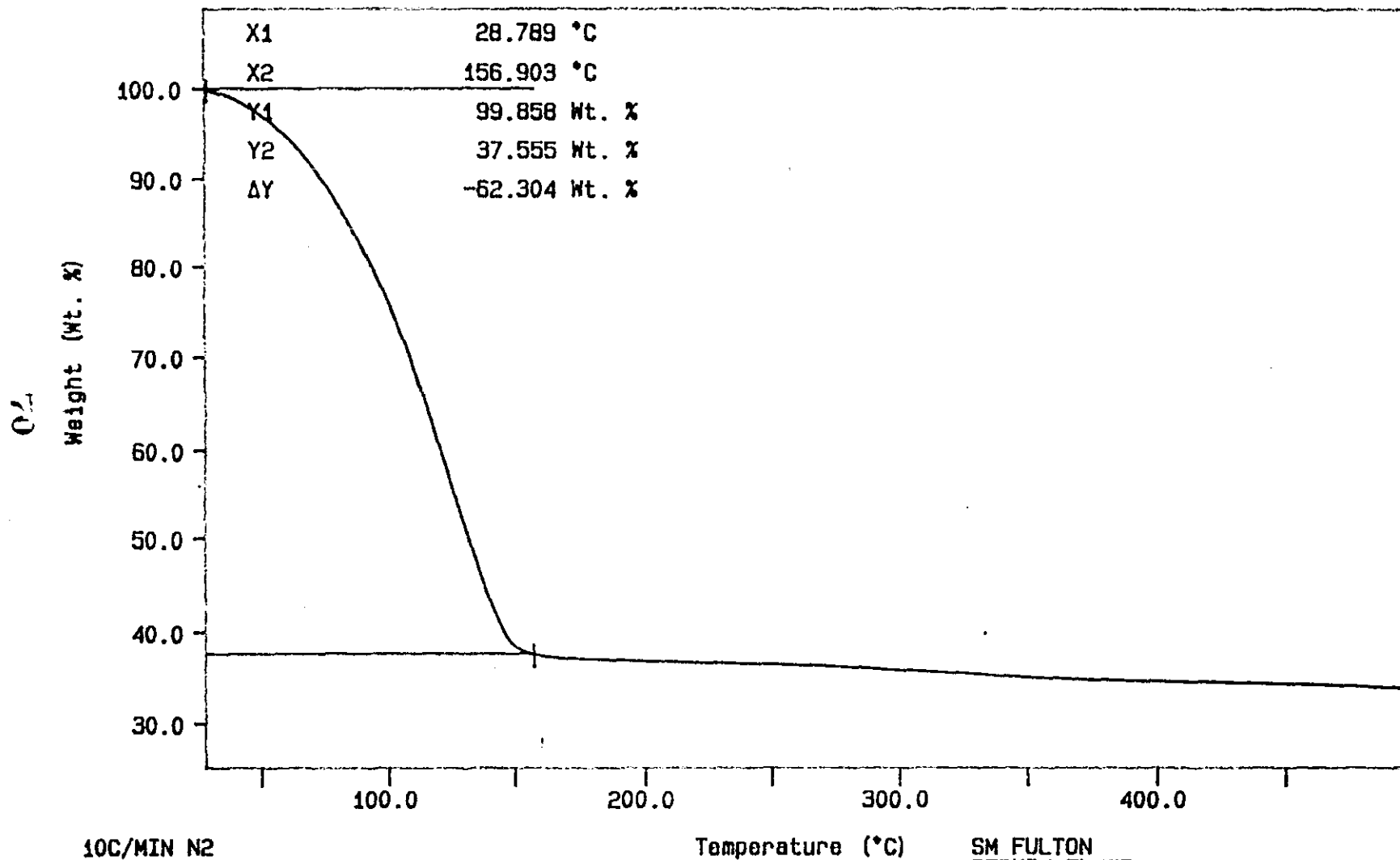
WHC-SD-WM-DP-157, REV. 0
157, REV. 1

Curve 1: TGA

File info: SAM112104 Tue Nov 21 21:08:37 1995

Sample Weight: 17.745 mg

S95T003746 DUP



TEMP: 30.0 C TIME: 0.0 min RATE: 10.0 C/min

SM FULTON
PERKIN-ELMER
7 Series Thermal Analysis System
Tue Nov 21 21:14:57 1995

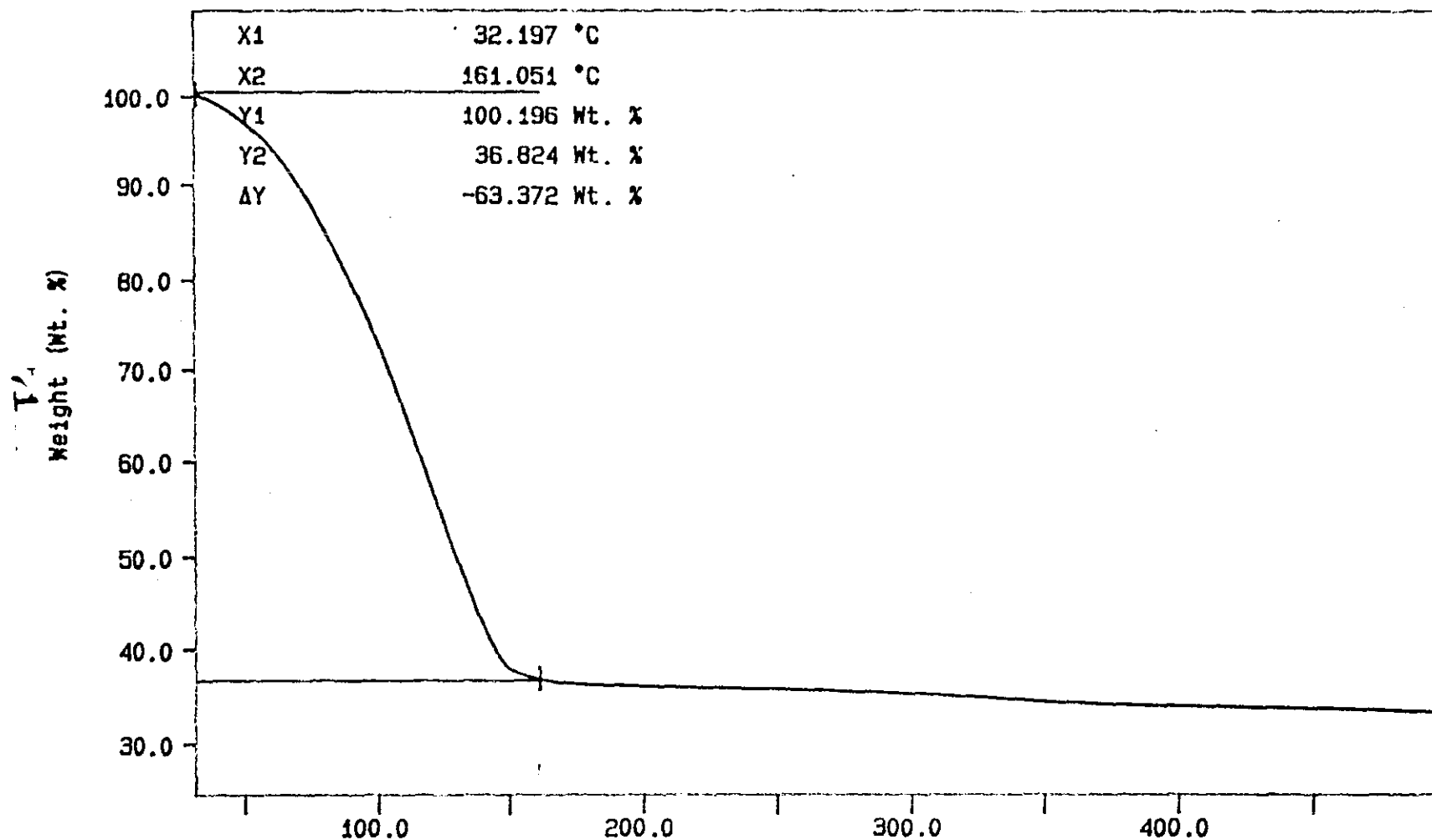
WHC-SD-WM-DP-157, REV. 1
WHC-SD-WM-DP-157, REV. 0

Curve 1: TGA

File info: SAM112105 Tue Nov 21 22:15:25 1995

Sample Weight: 16.036 mg

S95T003750



WHC-SD-WM-DP-157, REV. 0

WHC-SD-WM-DP-157, REV. 1

10C/MIN N2

TEMP1: 25.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min

TEMP2: 500.0 °C

Temperature (°C)

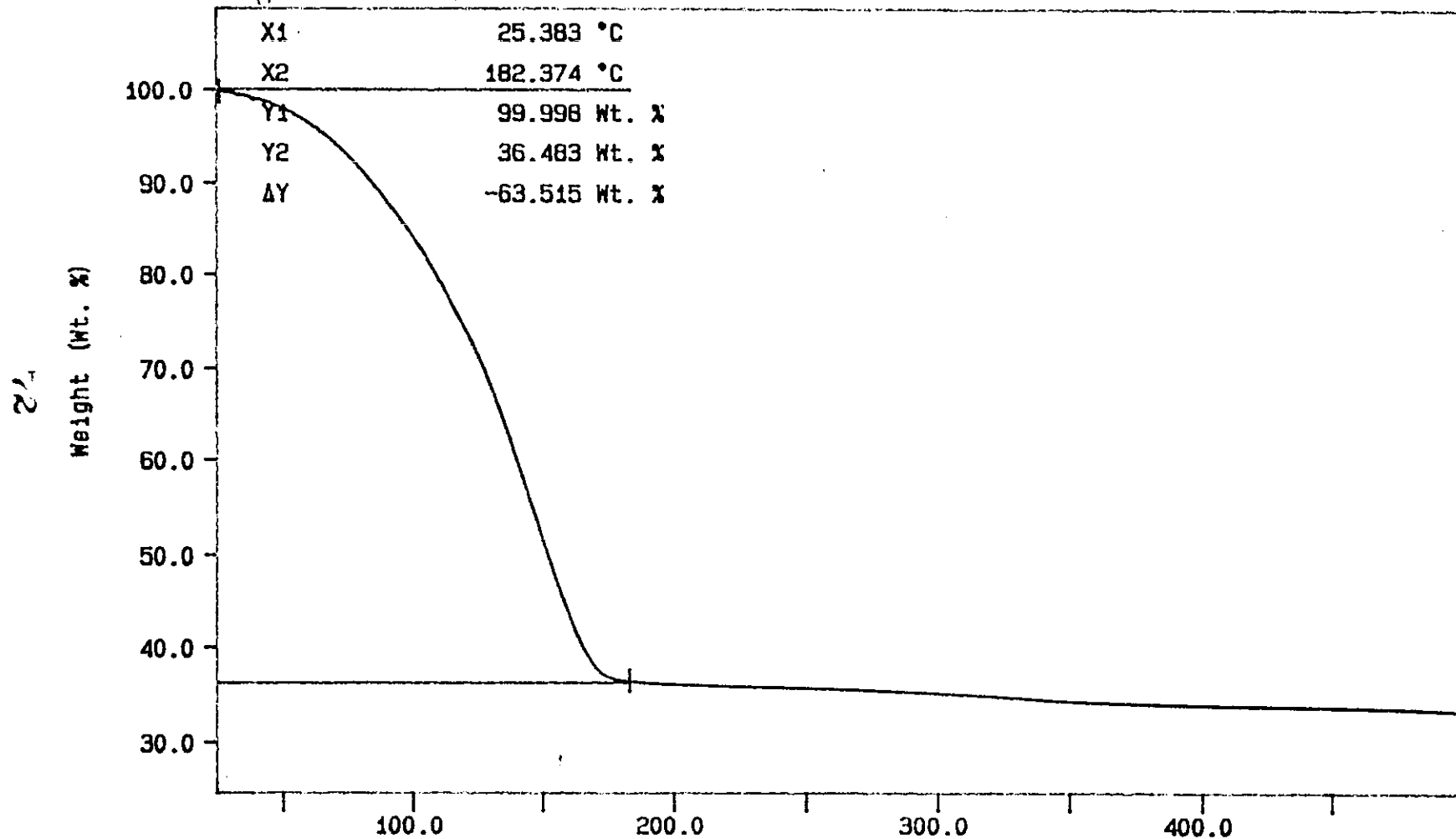
SM FULTON
PERKIN-ELMER
7 Series Thermal Analysis System
Tue Nov 21 22:31:24 1995

Curve 1: TGA

File info: SAM112106 Tue Nov 21 23:26:24 1995

Sample Weight: 28.341 mg

S95T003750 Dup
SMF
11.21.95



10C/MIN N2

TEMP1: 30.0 °C
TEMP2: 500.0 °C
TIME1: 0.0 min
RATE1: 10.0 °C/min

Temperature (°C)

SM FULTON
PERKIN-ELMER
7 Series Thermal Analysis System
Wed Nov 22 00:32:42 1995

WHC-SD-WM-DP-157, REV. 0
WHC-SD-WM-DP-157, REV. 1

WHC-SD-WM-DP-157, REV. 0
LABCORE Data Entry Template for Worklist#

4003

Analyst: JDS Instrument: TGA0 3 Book # 65N8-A

Method: LA-514-114 Rev/Mod C-1

WHC-SD-WM-DP-157, REV. 1

Worklist Comment: Please run BX-112 TGAs under N2. bdv

GROUP	PROJECT	S TYPE	SAMPLE#	R A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 STD			TGA-03	SOLID	<u>59.74</u>	<u>60.32</u>	<u>N/A</u>	%
95000202	BX-112	2 SAMPLE	S95T003746	1	TGA-03	SOLID	<u>N/A</u>	<u>60.72</u>		%
95000202	BX-112	3 DUP	S95T003746	1	TGA-03	SOLID	<u>60.72</u>	<u>61.77</u>	<u>N/A</u>	%

Final page for worklist # **4003**

See attached for signatures
Analyst Signature _____ Date 12/5/95

[Signature] 12-6-95
Analyst Signature _____ Date _____

Verified by Blandina
Valenzuela
12/6/95

Data Entry Comments: Sample produced a second weight loss step of
3.9762

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,
R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist#

4003

Analyst: Jds

Instrument: TGA0 12/5/95

Book # 65N8-A

Method: LA-560-112 Rev/Mod _____

WHC-SD-WM-DP-157, REV. 1

Worklist Comment: Please run BX-112 TGAs under N2. bdv

GROUP	PROJECT	S TYPE	SAMPLE#	R A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 STD			TGA-01	SOLID			N/A	%
95000202	BX-112	2 SAMPLE	S95T003746	0	TGA-01	SOLID	N/A			%
95000202	BX-112	3 DUP	S95T003746	0	TGA-01	SOLID			N/A	%

Final page for worklist #

4003

Jah Sph 12-5-95
Analyst Signature Date

Analyst Signature Date

Other instrument
was used.
12/5/95
BAN

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

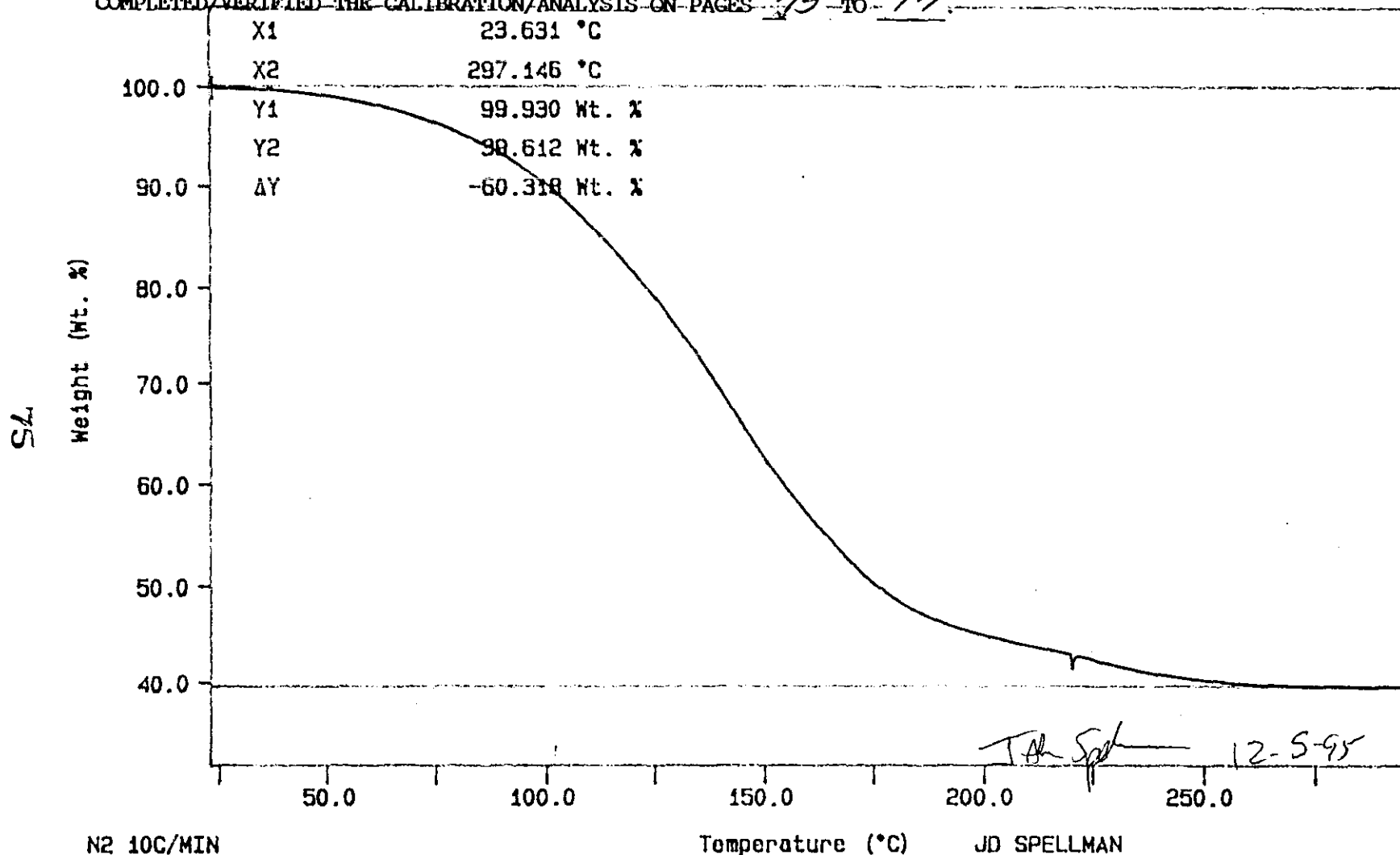
Curve 1: TGA

File info: TER120401 Mon Dec 4 18:36:35 1995

Sample Weight: 24.774 mg

65N8-A Terliq

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 75 TO 77

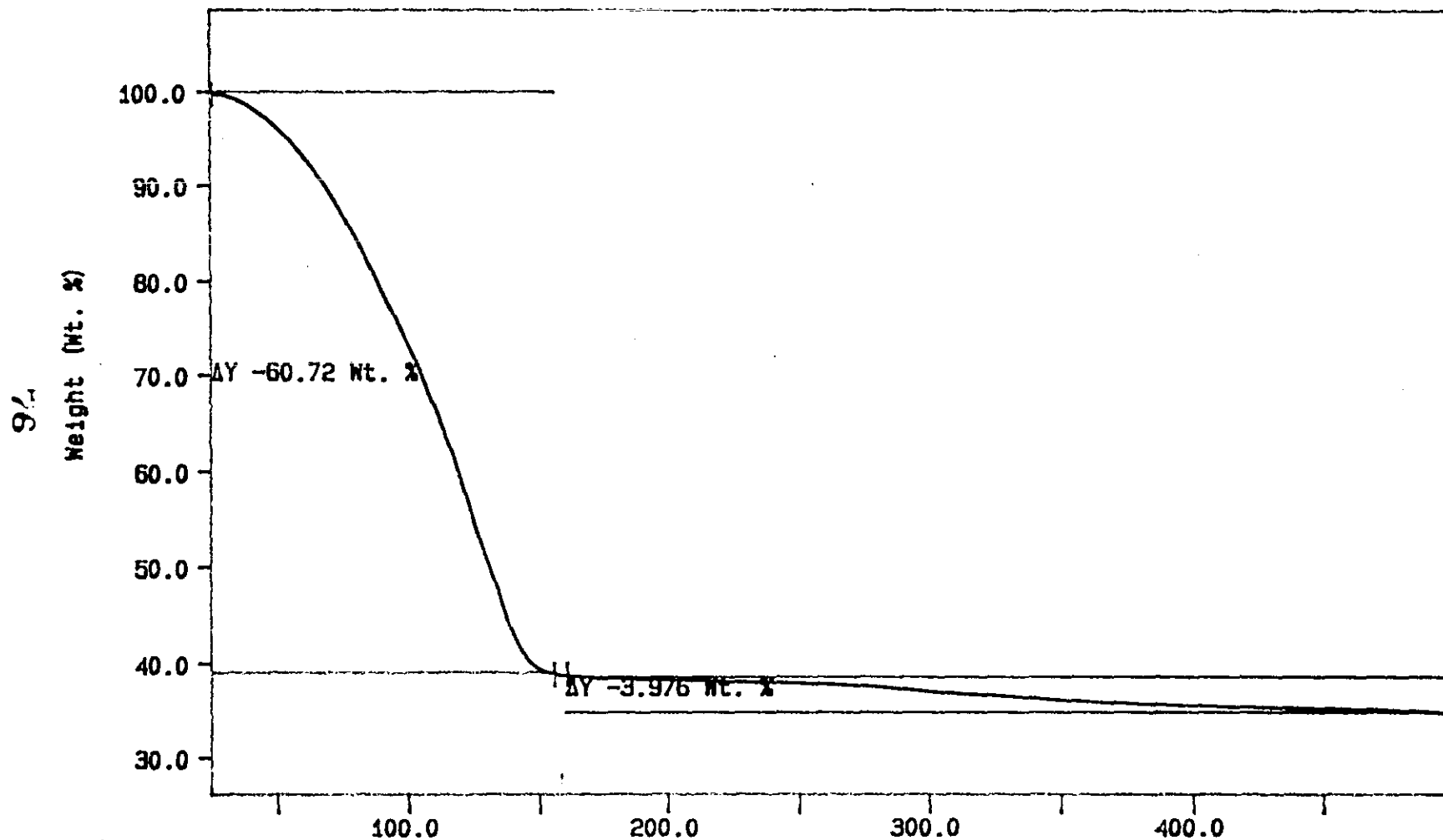


Curve 1: TGA

File info: SAM120401 Mon Dec 4 20:32:45 1995

Sample Weight: 17.990 mg

S95T003746



10C/MIN N2
TEMP: 30.0 C
TIME: 0.0 min RATE: 10.0 C/min

Temperature (°C)

JD SPELLMAN
PERKIN-ELMER
7 Series Thermal Analysis System
Mon Dec 4 20:36:09 1995

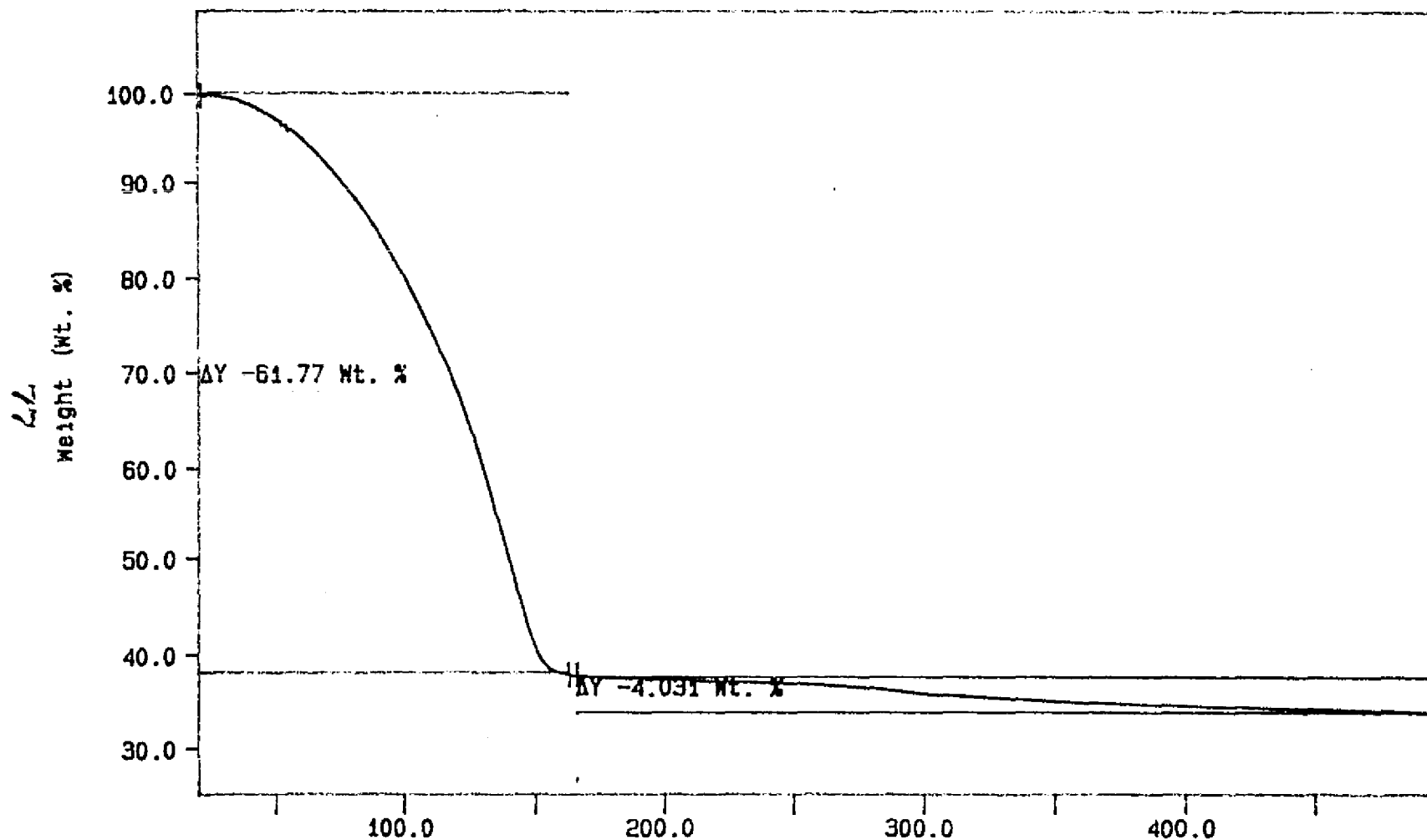
WHC-SD-WM-DP-157, REV. 1
WHC-SD-WM-DP-157, REV. 0

Curve 1: TGA

File info: SAM120502 Tue Dec 5 03:42:41 1995

Sample Weight: 21.542 mg

S95T003746 DUP



WMC-SD-WM-DP-157, REV. 1
WMC-SD-WM-DP-157, REV. 0

10C/MIN N2

TEMP1: 30.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 500.0 C

Temperature (°C)

JD SPELLMAN
PERKIN-ELMER
7 Series Thermal Analysis System
Tue Dec 5 04:19:48 1995

DISTRIBUTION SHEET

To Distribution	From Data Assessment and Interpretation	Page 1 of 1		
		Date: 02/15/96		
Project Title/Work Order WHC-SD-WM-DP-157, REV. 1 "Final Report for Tank 241-BX-112, Auger Samples 95-AUG-047 and 95-AUG-048"		EDT NO.: 613475 <i>clm 02/21/96</i>		
		ECN NO.: 629011		
Name	MSIN	Text With all Attach	EDT/ECN ONLY	
<u>Pacific Northwest Laboratory</u>				
J. R. Gormsen	K7-28		X	
S. J. Harris	K7-22	X		
K. L. Silvers	P7-27		X	
<u>U.S. Department of Energy, RL</u>				
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<u>Washington State Department of Ecology</u>				
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A. B. Stone	B5-18	X		
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Jim Poppiti			X	
12800 Middlebrook Rd.				
Trevion II, EM-36				
Germantown, MD 20874				